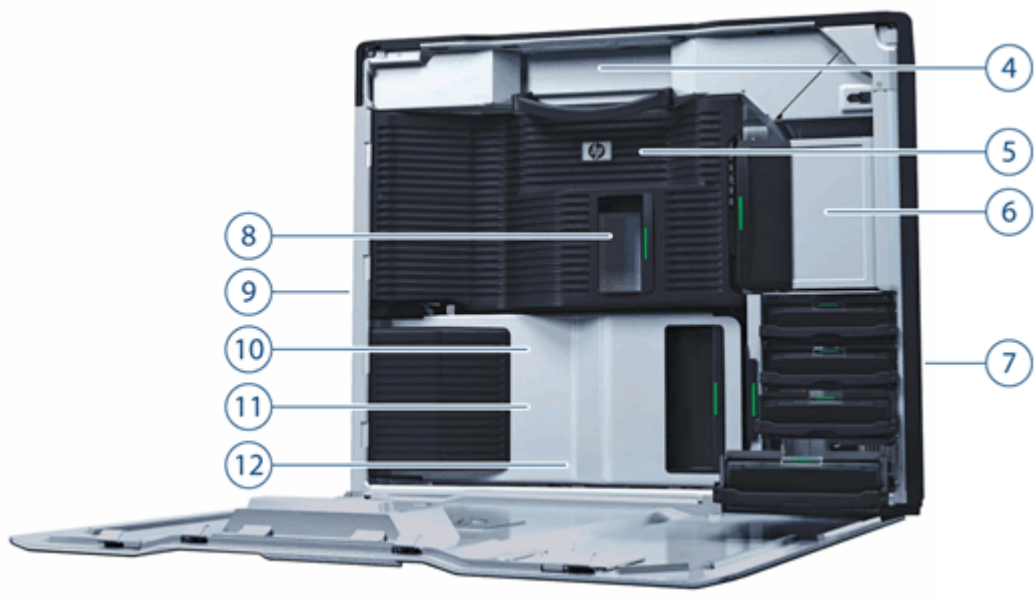
Overview

1. 3 External 5.25" Bays
2. Power Button
3. Front I/O: 3 USB 2.0, 1 IEEE 1394a, 1 Headphone out, 1 Microphone in

Overview



4. Choice of 850W, 85% or 1110W, 89% Power Supplies
5. 12 DIMM Slots for DDR3 ECC Memory
6. 3 External 5.25" Bays
7. 4 Internal 3.5" Bays
8. 2 Quad Core Intel 5500 Series Processors
9. Rear I/O: 1 IEEE 1394a, 6 USB 2.0, 1 serial, PS/2 keyboard/mouse
   2 RJ-45 to Integrated Gigabit LAN
   1 Audio Line In, 1 Audio Line Out, 1 Microphone In
10. 2 PCIe x16 Gen2 Slots
11.. 2 PCIe x8 Gen2, 1 PCIe x4 Gen2, 1 PCIe x4 Gen1, 1 PCI Slot
12 3 Internal USB 2.0 ports

Form Factor	Rackable Minitower
Operating Systems	Genuine Windows 7® Professional 32-bit*** Genuine Windows 7® Professional 64-bit*** Genuine Windows® 7 Ultimate 64-bit*** HP Linux Installer Kit for Linux [includes drivers for 32-bit & 64-bit OS versions of Red Hat Enterprise Linux(RHEL) 4 Workstation, Red Hat Enterprise Linux (RHEL) 5 Workstation, Red Hat Enterprise Linux (RHEL) 6 Workstation, 64-bit SUSE Linux Enterprise Desktop (SLED) 11] See http://www.hp.com/workstations/software/linux for details. Red Hat Linux Enterprise(RHEL) Drop In Box OS For detailed OS/hardware support information for Linux, see: http://www.hp.com/support/linux_hardware_matrix ***Systems may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details.
Available Processors	Intel® Xeon® processor X5660 2.80 GHz, 12MB cache 1333 MHz memory, 6-Core Intel® Xeon® processor X5650 2.66 GHz, 12MB cache 1333 MHz memory, 6-Core

	Intel® Xeon® processor E5640 2.66 GHz, 12MB cache 1066 MHz memory, 4-Core Intel® Xeon® processor E5620 2.40 GHz, 12MB cache 1066 MHz memory, 4-Core Intel® Xeon® processor X5690 3.46 GHz, 12MB cache 1333 MHz memory, 6-Core Intel® Xeon® processor X5687 3.60 GHz, 12MB cache 1333 MHz memory, 4-Core Intel® Xeon® processor X5675 3.06 GHz, 12MB cache 1333 MHz memory, 6-Core Intel® Xeon® processor X5672 3.20 GHz, 12MB cache 1333 MHz memory, 4-Core Intel® Xeon® processor X5647 2.93 GHz, 12MB cache 1333 MHz memory, 4-Core Intel® Xeon® processor E5649 2.53 GHz, 12MB cache 1333 MHz memory, 6-Core Intel® Xeon® processor E5645 2.40 GHz, 12MB cache 1333 MHz memory, 6-Core Intel® Xeon® processor E5607 2.26 GHz, 8MB cache 1066 MHz memory, 4-Core Intel® Xeon® processor E5606 2.13 GHz, 8MB cache 1066 MHz memory, 4-Core
Available Processor Disclaimers	When ordering two processors, the second processor must be the same as the first. Intel processor numbers are not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See: http://www.intel.com/products/processor_number/ for details. Quad and Six-Core technologies are designed to improve performance of multithreaded software products and hardware-aware multitasking operating systems and may require appropriate operating system software for full benefits; check with software provider to determine suitability; Not all customers or software applications will necessarily benefit from use of these technologies. 64-bit computing on Intel® 64 architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers, and applications enabled for Intel® 64 architecture. Processors will not operate (including 32-bit operation) without an Intel® 64 architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. See: http://www.intel.com/info/em64t for more information. Intel® Xeon® processor X5687 and Intel® Xeon® processor X5690 REQUIRE the 1110W Power Supply Option. Intel® Xeon® processor X5677 and Intel® Xeon® processor X5680 REQUIRE the 1110W Power Supply Option.
Additional Details	Intel® Nehalem Architecture (5500 Series Xeon) Intel® Westmere Architecture (5600 Series Xeon) Up to 6.4GT/s QPI support 3-channel 800/1066/1333 MHz DDR3* memory subsystem Up to 192GB memory capacity PCI Express I/O and PCIe x16 Gen2 graphics Dual integrated Broadcom 5764 Gigabit LAN on Motherboard (LOM) 6 channels of Serial ATA (SATA) and 8 channels of Serial Attached SCSI (SAS) 3.0 Gb/s natively supported internally; SATA RAID level 0, 1, 5 and 10 and SAS RAID** level 0, 1, 10 available on motherboard* SATA optical drives High Definition integrated audio with internal speaker Choice of 850W 85% efficient or 1110W 89% efficient power supply ENERGY STAR® qualification and energy-saving features available on selected configurations (Not supported by Linux) Protected by HP Services, including a 3 years parts, 3 years labour, and 3 years onsite service (3/3/3) standard warranty. Terms and conditions vary by country. Certain restrictions and exclusions apply. *Each processor supports up to 3 channels of DDR3 memory. To realize full performance at least 1 DIMM must be inserted into each channel. To get full 6 channel support, 2 processors MUST be installed. **SATA hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent functionality and performance. It is a good alternative to hardware-based RAID. Please visit http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf for

Overview

	RAID capabilities with Linux.	
Form Factor	Rackable Minitower	
Colour	Black/Silver	
I/O Slots (see system board section for more details)	• 2 PCI Express Gen2 x16 slots (full-length, full-height) • 2 PCI Express Gen2 x8 slots - with x16 connectors (full-length, full-height) • 1 PCI Express Gen2 x4 slot - with x8 connector (half-length, full-height) • 1 PCI Express Gen1 x4 slot - with x8 connector (full-length, full-height) • 1 PCI 32bit/33MHz slot, (full-length, full-height) • 1 Mechanical-only slot, supporting cards which mount only to the I/O bulkhead and not the motherboard (half-length, full-height) • The PCIe x8 connectors are open ended, allowing a PCIe x16 card to be seated in the slot.	
Bays (see storage section for more details)	Total Bays = 7	
Internal Bays	4 internal 3.5" bays (4 with acoustic dampening rail assemblies)	
External Bays	3 external 5.25" bays Top bay device depth limit: 175mm Middle bay device depth limit: 206mm Bottom bay device depth limit: 206mm	
Front I/O	3 USB 2.0, 1 Headphone Out, 1 Microphone In, and 1 IEEE 1394a	
Rear I/O	1 IEEE-1394a 6 USB 2.0 1 Serial PS/2 keyboard and mouse 2 RJ-45 to integrated Gigabit LAN 1 Audio Line In, 1 Audio Line Out, 1 Microphone In; audio ports can be retasked to function as line in, line out, microphone, or headphone.	
Internal USB	3 USB 2.0 3 USB 2.0 ports available by one 2x5 header and one 1x5 header: supports either up to two HP Internal USB Port Kits, AMO- EM165AA, one on each header, or one USB Media Card Reader. Each Internal Port Kit has two USB 2.0 connectors.	
Chassis Dimensions (H x W x D)	44.4 x 20.3 x 52.5 cm; 17.5 x 8.0 x 20.7 inches	
System Weight	Exact weights depend upon configuration Minimum config – 19.5 kg (43 lb) Typical config – 21 kg (46 lb) Maximum config – 29 kg (64 lb)	
Temperature	Operating:	5° to 35° C (40° to 95° F)
	Non-operating	–40° to 60° C (–40° to 140° F)
Humidity	Operating:	8% to 85%
	Non-operating	8% to 90%
Maximum Altitude (non-pressurized)	Operating:	3,000 m; 10,000 feet
	Non-operating	9,100 m; 30,000 feet
Power Supply	Choice of: • 850W 85% Efficient wide-ranging, active Power Factor Correction • 1110W 89% Efficient wide-ranging, active Power Factor Correction NOTE: The 1110W power supply can also supply 1250W of output power when the input voltage is greater than 105V. If the input voltage is less than 105V, but greater than 90V for any reason, the	

	maximum power that can be drawn is 1110W. An uninterruptible power supply (UPS) is highly recommended if 1250W output power is desired. The Z800 power supply efficiency reports can be found at these links: 850W – http://www.80plus.org/manu/psu/psu_reports/DELTA_DPS-50DB%20A_850W_80+_Report.pdf 1110W – http://www.80plus.org/manu/psu/psu_reports/DELTA_DPS-1050DBA_SO-035_1250W_Report.pdf
Interfaces Supported	• 6-channel SATA 3.0 Gb/s Interface (6 Serial-ATA connectors on the motherboard, 4 channels are eSATA configurable for use with eSATA CTO/AMO Kit) • 8-channel SAS interface (8 SAS connectors on the motherboard), SAS ports can be ported externally by using the SAS Bulkhead and/or Back Panel connector Kits • 1 Floppy interface (1 Floppy connector), IEEE 1394a, USB 2.0
Hard Drive Controller Supported	SATA and SAS controllers
Backup Devices	For a complete listing of compatible DAT tape drives, LTO tape drives and RDX Removable Disk Backup System offerings, please visit: http://www.hp.com/go/connect

Supported Components

Processors

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Four-Core and Six-Core Intel Xeon Processor 5600 Series with Intel® 64 Architecture - High Power				
Intel® Xeon® Processor X5690 6C 3.46 GHz, 130W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	LB217AA	2/14/2011-----Requires 1110W Power Supply
Intel® Xeon® Processor X5687 4C 3.60 GHz, 130W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	LB216AA	2/14/2011-----Requires 1110W Power Supply
Four-Core and Six-Core Intel Xeon Processor 5600 Series with Intel® 64 Architecture				
Intel® Xeon® Processor E5620 4C 2.40 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo	Y	Y	WG728AA	
Intel® Xeon® Processor E5640 4C 2.66 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo	Y	Y	WG730AA	
Intel® Xeon® Processor X5650 6C 2.66 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	WG731AA	
Intel® Xeon® Processor X5660 6C 2.80 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	WG732AA	
Intel® Xeon® Processor X5675 6C 3.06 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	LB215AA	2/14/2011
Intel® Xeon® Processor X5672 4C 3.20 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	LB214AA	2/14/2011
Intel® Xeon® Processor X5647 4C 2.93 GHz, 130W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo	Y	Y	LB213AA	2/14/2011
Intel® Xeon® Processor E5649 6C 2.53 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	LB212AA	2/14/2011
Intel® Xeon® Processor E5645 6C 2.40 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	LB211AA	2/14/2011
Intel® Xeon® Processor E5607 4C 2.26 GHz, 80W, 8M cache, 4.80 GT/s QPI, DDR3 1066MHz	Y	Y	LB210AA	2/14/2011
Intel® Xeon® Processor E5606 4C 2.13 GHz, 80W, 8M cache, 4.80 GT/s QPI, DDR3 1066MHz	Y	Y	LB209AA	2/14/2011

Intel® Xeon® processor X5687 and Intel® Xeon® processor X5690 Require the 1110W Power Supply Option.

Supported Components

		Factory Configured	Option Kit	Option Kit Part Number	Support Notes
	Sub-Section Description/Notes				
	NOTE 1: NCQ (Native Command Queuing) not supported in Red Hat Enterprise Linux For hard drives, 1 GB = 1 billion bytes; TB = 1 trillion bytes. Actual formatted capacity is less.				
SAS Hard Drives					
	HP SAS (Serial Attached SCSI) Hard Drives for HP Workstations				
	600GB SAS 15K rpm 6Gb/s 3.5" HDD	Y	Y	VM647AA	
	Sub-Section Description/Notes				
	Up to 5 SATA drives, 5 SAS, drives, or 6 SATA 2.5", Small Form Factor (SFF) drives If 1st drive is SATA, 2nd drive can be EITHER SATA or SAS 8 port SAS Controller included on the system board				
SATA Hard Drives	SATA (Serial ATA) Hard Drives for HP Workstations				
	160GB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	PV944A	
	250GB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	PY278AA	
	320GB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	FH963AA	
	500GB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	PV943A	
	1TB SATA 7200 rpm 3.0Gb/s 3.5" HDD	Y	Y	GE262AA	
	1.5TB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	VH997AA	
	2.0TB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	WE464AA	
	3.0TB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	QF298AA	
	300GB SATA 10K rpm SFF in 3.5" Frame HDD	Y	Y	FM802AA	
	160GB SATA 10K rpm SFF in 3.5" Frame HDD	Y	Y	EW222AA	
	600GB SATA 10K rpm SFF in 3.5" Frame HDD	Y	Y	XP309AA	
	Sub-Section Description/Notes				
	Up to 5 SATA drives, 5 SAS, drives, or 6 SATA 2.5", Small Form Factor (SFF) drives If 1st drive is SATA, 2nd drive can be EITHER SATA or SAS 3TB drive is not supported as a boot device. 3TB drives are ONLY supported in positions 2, 3, 4 and 5. 3TB drives must use LSI9260 Controller.				
SATA Solid State Drives	HP Solid State Drives for Workstations				
	HP 300GB SATA SSD	Y	Y	LZ069AA	
	HP 160GB SATA SSD	Y	Y	LZ704AA	
	HP 160GB SATA X25-M SSD	Y	Y	WV915AA	

Hard Drive Controllers		Factory Configured	Option Kit	Option Kit Part Number	Support Notes
	Factory integrated RAID on motherboard for SATA drives				
	RAID 0 Configuration - Striped Array	Y	Y		See note 1
	RAID 0 Data Configuration -- Boot/OS Drive + 2 Drive Striped Array	Y	Y		See note 2
	RAID 1 Configuration - Mirrored Array	Y	Y		See note 3
	RAID 10 Configuration - Striped/Mirrored Array	Y	Y		

RAID 5 Configuration - Parity Array	Y	Y		See note 4
Integrated SATA 3.0 Gb/s Controller				
Integrated SATA 3.0 Gb/s Controller	Y	Y		
Integrated LSI SAS 1068E Controller with RAID 0, 1, 1E/10E				
Integrated LSI SAS 1068E Controller with RAID 0 (IS), RAID 1(IM), RAID 10(IME) capability	Y	Y		
HP SAS Back Panel Connector kit				
HP SAS Back Panel Connector kit	Y	Y		Must have 4 or fewer SAS hard drives to configure this option
HP SAS Back Panel Bulkhead Connector Kit				
HP SAS Back Panel Bulkhead Connector Kit	Y	Y		HP SAS Back Panel Connector kit required. Internal SAS HD drives are not supported
LSI MegaRAID® 9260-8i SAS 6Gb/s ROC RAID Card and iBBU08 Battery Backup Unit				
LSI MegaRAID® 9260-8i SAS 6Gb/s ROC RAID Card	Y	Y	WE465AA	
Optional: LSI iBBU08 Battery Backup Unit for LSI 9260-8i	N	Y	LA783AA	

All RAID arrays must be less than 2 TB in size
NOTE 1: Minimum of 2 hard drives needed. All hard drives must be identical (size/speed/type/bus/functional capabilities). Must have 2, 3 or 4 HD Drives.
NOTE 2: Minimum of 3 SATA hard drives needed. All hard drives must be identical (size/speed/type/bus/functional capabilities).
At least 3 HD Drives required. May have 4th and 5th HD Drives. Drives must be the same drive (size/speed/type/functional capability).
NOTE 3: 2 SATA or 2 SAS hard drives required. All hard drives must be identical (size/speed/type/bus/functional capabilities).
Note 4: Minimum of 3 SATA hard drives needed. All SATA hard drives must be identical (size/speed/type/bus/functional capabilities). Must have 3 or 4 HD Drives. 5 HD Drives not allowed.
SATA hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent functionality and performance. It is a good alternative to hardware-based RAID. Please visit: http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf for RAID capabilities with Linux.
IS: Striping of 2 or more HDDs into a single logical volume
IM: Mirroring of 2 HDDs into a single logical volume
IME: Mirroring of 3 or more HDDs into a single logical volume
NOTE: Specific user-configured hardware SAS RAID configurations are supported on this Linux system. Please visit: http://www.hp.com/support/linux_hardware_matrix for details

Supported Components

Graphics	Factory Configured	Option Kit	Option Kit Part Number	Support Notes	Supported Multi Mixed
Professional 2D					
NVIDIA Quadro NVS 295 256MB PCIe Graphics Card	Y	Y	FY943AA		2
NVIDIA NVS300 512MB PCIe Graphics Card	Y	Y	XP612AA		2
AMD FirePro 2270 512MB Graphics Card	Y	Y	LA524AA	3/1/2011	2
Entry 3D					
ATI FirePro V3700 256MB PCIe Graphics Card	Y	Y	FY944AA		2
NVIDIA Quadro FX 380 256MB PCIeGraphics Card	Y	Y	NB769AA		2
NVIDIA Quadro 400 512MB Graphics Card	Y	Y	LD542AA		2
ATI FirePro V3800 512MB PCIe Graphics Card	Y	Y	WL048AA		2
ATI FirePro V4800 1GB Graphics Card	Y	Y	WL049AA		2
NVIDIA Quadro 600 1GB Graphics Card	Y	Y	WS093AA		2
Mid-range 3D					
AMD FirePro V5900 2GB Graphics	Y	Y	LS992AA		2
NVIDIA Quadro 2000 1GB Graphics Card	Y	Y	WS094AA		2
High End 3D					
NVIDIA Quadro 5000 2.5GB Graphics Card	Y	Y	WS096AA		2
NVIDIA Quadro 4000 2GB Graphics Card	Y	Y	WS095AA		2
NVIDIA Quadro 6000 6GB Graphics Card	Y	Y	WS097AA		2
AMD FirePro V7900 2GB Graphics	Y	Y	LS993AA		2

NVIDIA Quadro 6000 REQUIRES the Z800 with the 1110W Power Supply Option
2nd Quadro 4000 REQUIRES the Z800 with the 1110W Power Supply Option
2nd Quadro 5000 REQUIRES the Z800 with the 1110W Power Supply Option

Supported Components

High Performance GPU Computing	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
NVIDIA Tesla C2050 Compute Processor	Y	Y	WT428AA	Note #1
NVIDIA Tesla C2075 Compute Processor	Y	Y	QB035AA	Note #2

NOTE #1: Dual (2) NVIDIA Tesla C2050 processors are supported with 1110 W chassis. Supported with "No Integrated Graphics" or FX380 only. Not supported with dual 130w/high power processors.
NOTE #2: Only supported with 1110 W chassis. Supported with "HP Hi Perf GPU Compute Graphics Only", Q400,Q600, FX380, Q5000, Q6000 and Q2000 only. Not supported with 2 graphics cards. Not supported with dual 130W high powered processors and FX5800 or Q6000 graphic cards and RAM Fullmem. Not supported with OS WIN32.

Memory	CTO	Option Kit Part Number	Support Notes
	PC3-10600 DDR3-1333 ECC Registered DIMMs CTO		
	12GB (3x4GB) DDR3-1333 ECC Registered RAM 1-CPU		1 Processor Configuration
	24GB (6x4GB) DDR3-1333 ECC Registered RAM 1-CPU		1 Processor Configuration
	24GB (6x4GB) DDR3-1333 ECC Registered RAM 2-CPU		2 Processors Required
	32GB (8x4GB) DDR3-1333 ECC Registered RAM 2-CPU		2 Processors Required
	48GB (12x4GB) DDR3-1333 ECC Registered RAM 2-CPU		2 Processors Required
	64GB (8x4GB+4x8GB) DDR3-1333 ECC Registered RAM 2-CPU		2 Processors Required
	64GB (8x8GB) DDR3-1333 ECC Registered RAM 2-CPU		2 Processors Required
	72GB (6x4GB+6x8GB) DDR3-1333 ECC Registered RAM 2-CPU		2 Processors Required
	96GB (12x8GB) DDR3-1333 ECC Registered RAM 2-CPU		2 Processors Required
	PC3-10600 DDR3-1333 ECC Unbuffered DIMMs CTO		
	1GB (1x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		1 Processor Configuration
	2GB (2x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		1 Processor Configuration
	2GB (2x1GB) DDR3-1333 ECC Unbuffered RAM 2-CPU		2 Processors Required
	3GB (3x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		1 Processor Configuration
	4GB (2x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		1 Processor Configuration

4GB (4x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU	1 Processor Configuration
4GB (4x1GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	2 Processors Required
6GB (3x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU	1 Processor Configuration
6GB (6x1GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	2 Processors Required
8GB (4x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU	1 Processor Configuration
8GB (8x1GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	2 Processors Required
12GB (6x2GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	2 Processors Required
16GB (8x2GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	2 Processors Required
18GB (6x2GB+6x1GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	2 Processors Required
24GB (12x2GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	2 Processors Required

PC3-8500R DDR3-1066 ECC Registered DIMMs CTO

96GB (6x16GB) DDR3-1066 ECC Registered RAM 2-CPU	2 Processors Required
128GB (8x8GB+4x16GB) DDR3-1066 ECC Registered RAM 2-CPU	2 Processors Required
144GB (6x8GB+6x16GB) DDR3-1066 ECC Registered RAM 2-CPU	2 Processors Required
160GB (10x16GB) DDR3-1066 ECC Registered RAM 2-CPU	2 Processors Required
192GB (12x16GB) DDR3-1066 ECC Registered RAM 2-CPU	2 Processors Required

Sub-Section Description/Notes

The 16GB DIMMs used on the Z800 are DDR3, 1066MHz. The 8GB DIMMs are DDR3, 1333MHz. When combined with the 16GB 1066MHz DIMMs, the 8GB DIMMs run at a maximum of 1066MHz.

After Market Options (AMO)

PC3-10600 DDR3-1333 ECC Registered DIMMs AMO

8GB (1x8GB) DDR3-1333 ECC Registered RAM	FX622AA
4GB (1x4GB) DDR3-1333 ECC Registered RAM	FX621AA

PC3-10600 DDR3-1333 ECC Unbuffered DIMMs AMO

2GB (1x2GB) DDR3-1333 ECC Unbuffered RAM	FX699AA
1GB (1x1GB) DDR3-1333 ECC Unbuffered RAM	FX698AA

PC3-8500R DDR3-1066 ECC Registered DIMMs AMO

16GB (1x16GB) DDR3-1066 ECC Registered RAM	NL674AA

NOTE: You cannot intermix registered and unbuffered DIMMs. The system will not work.

Multimedia and Audio Devices

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Integrated Intel/Realtek HD ALC262 Audio	Y	N		
HP Thin USB Powered Speakers	Y	Y	KK912AA	
Creative X-Fi Titanium PCIe Audio Card	Y	Y	NH222AA	See note 1

NOTE 1: The SoundBlaster X-Fi Titanium audio card is supported on the HP Z Series Workstations with Microsoft Windows XP Pro 32-bit and 64-bit and Microsoft Vista 32-bit and 64-bit versions. Linux is not supported.

Optical and Removable Storage

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP 16X DVD-ROM SATA Drive	Y	Y	AR629AA	See note 2
HP 16X DVD+-RW SuperMulti SATA Drive	Y	Y	EW269AA	
HP Slot Load DVD+/-RW Drive	Y	N		See note 1
HP Blu-Ray Writer	Y	Y	AR482AA	
HP 22-in-1 Media Card Reader Kit (Workstations)	N	Y	NK361AA	
HP DX115 Removable Drive Enclosure				
HP DX115 Carrier with 160GB SATA HDD	Y	Y	FZ577AA	
HP DX115 Removable HDD Frame/Carrier	N	Y	FZ576AA	
HP DX115 Removable HDD Carrier	N	Y	NB792AA	

Actual speeds may vary. Does not permit copying of commercially available DVD movies or other copyright protected materials. Intended for creation and storage of your original material and other lawful uses. Double Layer discs can store more data than single layer discs. However, double-layer discs burned with this drive may not be compatible with many existing single-layer DVD drives and players. As Blu-ray is a new format containing new technologies, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.

NOTE 1: May only order one.

NOTE 2: Cannot be 2nd drive.

Controller Cards

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP IEEE 1394b FireWire PCIe Card	Y	Y	NK653AA	
HP USB 3.0 2x2 Port SuperSpeed PCIe x1 Card	Y	Y	QT587AA	
HP SuperSpeed USB 3.0 PCIe x1 Card	Y	Y	BM867AA	3/1/2011

Supported Components

Monitors

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP LP2065 20-inch LCD Monitor	Y	Y	EF227A4	
HP LP2475w 24-inch Widescreen LCD Monitor	Y	Y	KD911A4	
HP DreamColor LP2480zx Professional Display	Y	Y	GV546A4	
HP LP3065 30-inch Widescreen LCD Monitor	Y	Y	EZ320A4	
HP ZR22w 21.5-inch S-IPS LCD Monitor	Y	Y	VM626A4	
HP ZR24w 24-inch S-IPS LCD Monitor	Y	Y	VM633A4	
HP ZR30w 30-inch S-IPS LCD Monitor	Y	Y	VM617A4	

Supported by all Operating Systems available from HP

Screen size diagonally measured

Networking and Communications

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Integrated Broadcom 5764 PCIe LOM Controller	Y	N		
Broadcom NetXtreme Gigabit Ethernet Plus NIC (PCIe)	Y	Y	FS215AA	
HP NC360T PCI Express Dual Port Gigabit NIC	N	Y	KU004AA	
Intel Gigabit CT Desktop NIC	N	Y	FH969AA	

"Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/sec. For high speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

Racking and Physical Security

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Security Cable with Kensington Lock	N	Y	PC766A	
HP Chassis Intrusion Sensor	Y	N		
HP Z6/Z8 Adjustable Sliding Rail Rack Kit	N	Y	NN124AA	

Supported Components

Input Devices

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP PS/2 Standard Keyboard	Y	Y	DT527A	
HP USB Standard Keyboard	Y	Y	DT528A	
HP PS/2 Optical Scroll Mouse	Y	Y	EY703AA	
HP USB 2-Button Optical Scroll Mouse	Y	Y	DC172B	
HP USB Laser Mouse	Y	Y	GW405AA	
HP USB Optical 3-Button Mouse	Y	Y	DY651A	
HP USB Smart Card Keyboard	Y	Y	ED707AA	
HP 2.4GHz Wireless Keyboard & Mouse	N	Y	NB896AA	
HP USB Optical 3-Button 2.9M OEM Mouse	N	Y	ET424AA	
HP SpaceExplorer 3D USB Controller	N	Y	RY429AA	
HP SpacePilot 3D USB Intelligent Controller	N	Y	EF390AA	

Other Hardware

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Internal USB Port Kit	Y	Y	EM165AA	
HP SAS Back Panel Connector Kit	Y	Y	EM164AA	
HP eSATA PCI Cable Kit	Y	Y	GM110AA	
HP Power Cord Kit	Y	Y		
HP ENERGY STAR 5.0 Enabled Configuration	Y	Y		

Software

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Performance Advisor	Y	N		Supports Windows 7 only. Available as a web download/install starting 1/7/2010. Included in the Windows 7 preload starting 3/1/2010.
Roxio Easy Media Creator (DVD/Blu-ray Disc burner software)	Y	N		
Intervideo WinDVD (DVD player/burner software)	Y	N		

Supported Components

HP ProtectTools Security	Y	N	Must select as a Configure to Order Option. Delivered as a "Drop in the Box" CD
PDF Complete - Trial Edition	Y	N	
HP Client Manager Software v6.2 (optional download)	Y	N	
MS Office Home & Business 2010	Y	N	
Parallels Workstation 4.0 Extreme	Y	N	

Operating Systems	Support Notes
Genuine Windows® 7 Ultimate 64-bit	See Note 1
Genuine Windows® 7 Professional 32-bit	See Note 1
Genuine Windows® 7 Professional 64-bit	See Note 1
HP Linux Installer Kit	
Red Hat Enterprise Linux (RHEL) Workstation - Paper License (1yr)	Not Preloaded - Drop In Box
SUSE Linux Enterprise Desktop 11	Not Preloaded on the Z800 - Supported only.

NOTE 1: Systems may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details.

System Board	
System Board Form Factor	Custom Form Factor, 13" x 14.25" (330.20mm x 361.95mm)
Processor Socket	Dual LGA 1366
CPU Bus Speed	QPI: Up to 6.4GT/sec
Chipset	Intel® 5520
Super I/O Controller	SMSC SCH5327, Rev B
Memory Expansion Slots	12 slots (6 slots per CPU)
Memory Type Supported	DDR3, RDIMM (Registered) or UDIMM (Unbuffered), ECC
Memory Modes	NUMA (Non-Uniform Memory Architecture), Memory Node Interleave
Memory Speed Supported	800MHz, 1066MHz, & 1333MHz
Maximum Memory	Supports up to 24GB using UDIMMs Supports up to 192GB using RDIMMs

	Single Processor					
	CPU0					
Capacity	DIMM1	DIMM2	DIMM3	DIMM4	DIMM5	DIMM6
1GB	1GB					
2GB	1GB		1GB			
3GB	1GB		1GB		1GB	
4GB	2GB		2GB			
6GB	2GB		2GB		2GB	
8GB	2GB	2GB	2GB		2GB	
12GB	2GB	2GB	2GB	2GB	2GB	2GB
16GB	4GB	4GB	4GB		4GB	
24GB	4GB	4GB	4GB	4GB	4GB	4GB
32GB	8GB	4GB	8GB	4GB	8GB	
48GB	8GB	8GB	8GB	8GB	8GB	8GB

	Dual Processor											
	CPU0						CPU1					
Capacity	DIMM1	DIMM2	DIMM3	DIMM4	DIMM5	DIMM6	DIMM7	DIMM8	DIMM9	DIMM10	DIMM11	DIMM12
2GB	1GB						1GB					
4GB	1GB		1GB				1GB		1GB			
6GB	1GB		1GB		1GB		1GB		1GB		1GB	
8GB	2GB		2GB				2GB		2GB			
12GB	2GB		2GB		2GB		2GB		2GB		2GB	
18GB	2GB	1GB	2GB	1GB	2GB	1GB	2GB	1GB	2GB	1GB	2GB	1GB
16GB	2GB	2GB	2GB		2GB		2GB	2GB	2GB		2GB	
24GB	2GB	2GB	2GB	2GB	2GB	2GB	2GB	2GB	2GB	2GB	2GB	2GB
32GB	4GB	4GB	4GB		4GB		4GB	4GB	4GB		4GB	
48GB	4GB	4GB	4GB	4GB	4GB	4GB	4GB	4GB	4GB	4GB	4GB	4GB
64GB	8GB	4GB	8GB	4GB	4GB	4GB	8GB	4GB	8GB	4GB	4GB	4GB
96GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB
144GB	16GB	8GB	16GB	8GB	16GB	8GB	16GB	8GB	16GB	8GB	16GB	8GB
160GB	16GB	16GB	16GB	16GB	16GB		16GB	16GB	16GB	16GB	16GB	
192GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB

Memory Configuration (Supported)	• Not all memory configurations possible are represented below. Also, 512 MB configurations are not supported for 64-Bit operating systems. • Only ECC DIMMs are supported. • RDIMM and UDIMM memory modules cannot be mixed in the system. • Do not install memory modules into memory slots if corresponding processor is not installed. • Dual processor configurations with memory modules installed for only one processor is not supported. • The 4GB DIMM for Z4 and Z6 is not compatible with the Z8 4GB DIMM. They are not interchangeable.	
PCI Express Connectors	PCIe2 x16, qty 2 PCIe2 x16 (x8 electrical), qty 2 PCIe2 x8 (x4 electrical), qty 1 PCIe x8 (x4 electrical), qty 1	
PCI Connectors (5.0V)	PCI 32b, 33MHz (supports 64-bit cards), qty 1	
Supported Drive Interfaces	**SATA**	Integrated 6-channel SATA 3.0Gb/sec controller with RAID 0, 1, 5, 10 and NCQ. (Factory integrated RAID is Microsoft Windows only)
	Serial Attached SCSI	Integrated 8-channel SAS 3.0Gb/sec controller with HW RAID 0, 1, 10.
	Integrated RAID	SATA: RAID 0, 1, 5, 10 SAS: HW RAID 0, 1, 10
	Integrated Graphics	None
	Network Controller	Dual Controller Broadcom 5764 PCI-E LAN Controller Memory Integrated 48KB receive buffer and 8KB transmit buffer Data rates supported 10/100/1000 Mb/s Compliance IEEE 802.3, 802.3AB and 802.3u compliant, 802.3x flow control Bus architecture PCIe 1.0a Data path width X1 to each controller

		Data path speed 2.5 Gb/s per direction transfer rate Data transfer mode Bus-master DMA Power requirement 1.0 watts @ +3.3V AUX supply Boot ROM support Yes Network transfer rate 10BASE-T (half-duplex) 10 Mb/s 10BASE-T (full-duplex) 20 Mb/s 100BASE-TX (half-duplex) 100 Mb/s 100BASE-TX (full-duplex) 200 Mb/s 1000BASE-T (full-duplex) 2000 Mb/s Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP Management capabilities WOL, PXE 2.1 and ASF 2.0
	PCI-X Connectors	None
	PCI Card Guide	Yes
	Wake on LAN	Yes
	Integrated Trusted Platform Module	TPM 1.2
	ASF 1.0 & 2.0 (Alert Standard Format)	Yes
	SATA Connectors	6 ports/connectors (Included are 4 eSATA configurable with optional eSATA After-Market Option cable kit)
IEEE 1394 Connector(s)	Front	Yes, 1394a
	Rear	Yes, 1394a
	Internal	None
USB Connector(s)	Front	Yes, qty 3
	Rear	Yes, qty 6
	Internal	Yes, qty 3 3 USB 2.0 ports available by one 2x5 header and one 1x5 header: supports either up to two HP Internal USB Port Kits, AMO- EM165AA, one on each header, or one USB Media Card Reader. Each Internal Port Kit has two USB 2.0 connectors.
HD Integrated Audio	Yes	
Flash ROM	Yes, SPI Rom	
CPU Fan Header	Yes, qty 2	
Chassis Fan Header	Yes, a single fan header for 2 fans.	
Front PCI Fan Header	Yes, qty 2	
Front Control Panel/Speaker Header	Yes	
CMOS Battery Holder - Lithium	Yes	
Integrated Trusted Platform Module	Integrated TPM 1.2	
Power Supply Headers	Yes: 9x2, 5x2, 4x2	
Power Switch, Power LED & Hard Drive LED Header	Yes	
Clear Password Jumper	Yes	

System Technical Specifications

Serial Port	Yes, on rear panel
Parallel Port	No
Keyboard/Mouse	Yes
Power Supply	850W 85% Efficient Wide-Ranging, Active PFC, Custom 1110W 89% Efficient Wide-Ranging, Active PFC, Custom NOTE: The 1110W power supply can also supply 1250W of output power when the input voltage is greater than 105V. If the input voltage is less than 105V, but greater than 90V for any reason, the maximum power that can be drawn is 1110W. An uninterruptible power supply (UPS) is highly recommended if 1250W output power is desired.
Operating Voltage Range	90–269 VAC
Rated Voltage Range	850W: 100–127 VAC 200–240 VAC 1110W: 100 VAC 115 VAC 200–240 VAC
Rated Line Frequency	50–60 Hz
Operating Line Frequency Range	47–66 Hz 393 – 407 Hz
Rated Input Current	850W: 11A @ 100–127V, 5.5A @ 200–240V 1110W: 12A @ 100V 1250W: 12A @ 115V, 10A @ 200–240V
Heat Dissipation	850W: Typical = 1707 BTU/hr, Max = 3558 BTU/hr 1110W: Typical = 2128 BTU/hr, Max-1 = 4457 BTU/hr, Max-2 = 5019 BTU/hr
Power Supply Fan	850W: 2x80x25 mm variable speed 1110W: 2x80x25 mm variable speed
ENERGY STAR® qualified (Config Dependent)	Yes
80 PLUS Compliant	Yes. 850W 85% For the ECOs PSU Efficiency Report for the power supply, please go to this link: http://www.80plus.org/manu/psu/psu_reports/DELTA_DPS-850DB%20A_850W_80+_Report.pdf Yes. 1110W 89% For the ECOs PSU Efficiency Report for the power supply, please go to this link: http://www.80plus.org/manu/psu/psu_reports/DELTA_DPS-1050DBA_SO-035_1250W_Report.pdf
FEMP Standby Power Compliant 115V (Wake-on LAN disabled) (<2W in S5 - Power Off)	Yes
Power consumption in sleep mode (as defined by ENERGY STAR) - Suspend to RAM (S3)	850W: <20W 1110W: <20W
Built-in Self Test (BIST) LED	Yes

Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)	Yes			
ENERGY STAR® qualified	Yes			
AUX IN (audio)	No			
Clear CMOS Button	Yes			
Chassis Speaker Header	Yes, as part of Front UI (Control Panel) cable header			
Multibay Header	No			
Integrated Gigabit Ethernet	Yes, dual port.			
Access Panel Solenoid Lock Header	No			
Access Panel Intrusion Sensor Header	Yes, as part of Front UI (Control Panel) cable header			
Memory Fan Connector	Yes, blind-mate			
Z800 Required Power Supply Info				
Power Supply	850WCustom PSU – (Wide Ranging Active PFC)		1110W/1250W* Custom PSU – (Wide Ranging Active PFC)	
Operating Voltage Range	90 – 269 VAC		90 – 269 VAC	
Rated Voltage Range	100–127 VAC 200–240 VAC	118 VAC	100 VAC 115 VAC 200–240 VA	118 VAC
Rated Line Frequency	50-60 Hz	400 Hz	50-60 Hz	400 Hz
Operating Line Frequency Range	47 – 66 Hz	393 – 407 Hz	47 – 66 Hz	393 – 407 Hz
Rated Input Current	11.0A @ 110-127 VAC 5.5A @ 200-240 VAC	11.0A @118 VAC	12A @ 100 VAC, 1110 W 12A @ 115 VAC, 1250 W 10A @ 200-240 VAC, 1250 W	12A @118 VAC, 1250W
Heat Dissipation (Configuration and software dependent)	Typical 1707 btu/hr (430 kg-cal/hr) Max 3538 btu/hr (892 kg-cal/hr)		Typical 2128 btu/hr (536 kg-cal/hr) Max1 4457 btu/hr (1123 kg-cal/hr) Max2 5019 btu/hr (1265 kg-cal/hr)	
Power Supply Fan	2x80x25 mm variable speed		2x80x25 mm variable speed	
Energy Star Compliant (config dependent)	YES		YES	
80 PLUS® Compliant	YES, BRONZE		YES, SILVER	
FEMP Standby Power Compliant@115V (Wake-on LAN disabled)(<2W in S5-Power Off)	YES		YES	
EuP Compliant@230V (<1 W in S5-Power Off)	YES		YES	

System Technical Specifications

Power Consumption in sleep mode (as defined by ENERGY STAR) – Suspend to RAM (S3) (Instantly Available PC) measured at 115V.	<20W	<20W
Built-in Selft Test LED	YES	YES
Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V	YES	YES
	*Input Voltage Restrictions	

System Configuration		
Example Configuration #1	*Processor Info*	1xXeon E5504 (2.00GHz, 4MB/800)
	Memory Info	3x1GB DR 1067 MHz (UDIMM)
	Graphics Info	1xFX1800
	Disks/Optical/Floppy	1x250GB SATA / 1 Optical / 1 Floppy
	PSU	850W 80 PLUS® BRONZE

Energy Consumption	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	130.5 W		127.4 W		130.5 W	
Windows Busy Typ (S0)	205.32 W		201.97 W		208.41 W	
Windows Busy Max (S0)	240.84		235.49 W		245.00 W	
Sleep (S3)	6.39 W	6.02 W	6.82 W	6.43 W	6.37 W	5.98 W
Off (S5)	1.43 W	1.20 W	1.85 W	1.65 W	1.39 W	1.17 W
Zero Power Mode (EuP)	0.40 W		0.85 W		0.37 W	

Heat Dissipation**	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	445.4 btu/hr		434.82 btu/hr		445.40 btu/hr	
Windows Busy Typ (S0)	700.76 btu/hr		689.32 btu/hr		711.30 btu/hr	
Windows Busy Max (S0)	821.99 btu/hr		803.73 btu/hr		836.19 btu/hr	
Sleep (S3)	21.8 btu/hr	20.6 btu/hr	23.3 btu/hr	21.9 btu/hr	21.7 btu/hr	20.4 btu/hr
Off (S5)	4.88 btu/hr	4.10 btu/hr	6.31 btu/hr	5.63 btu/hr	4.74 btu/hr	3.99 btu/hr
Zero Power Mode (EuP)	1.37 btu/hr		2.90 btu/hr		1.26 btu/hr	

System Technical Specifications

Example Configuration #2	*Processor Info*	2xXeon E5570 (2.93GHz, 8MB/1333)
	Memory Info	6x1GB DR 1333 MHz (UDIMM)
	Graphics Info	1xFX3800
	Disks/Optical/Floppy	2x250GB SATA / 2 Optical / 1 Floppy
	PSU	850W 80 PLUS® BRONZE

Energy Consumption	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	199.10 W		196.20 W		198.20 W	
Windows Busy Typ (S0)	445.20 W		434.90 W		443.40 W	
Windows Busy Max (S0)	516.50 W		504.00 W		524.60 W	
Sleep (S3)	7.84 W	7.49 W	8.29 W	7.89 W	7.92 W	7.47 W
Off (S5)	1.43 W	1.21 W	1.86 W	1.64 W	1.39 W	1.18 W
Zero Power Mode (EuP)	0.41 W		0.84 W		0.38 W	

Heat Dissipation**	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	679.53 btu/hr		669.63 btu/hr		676.46 btu/hr	
Windows Busy Typ (S0)	1519.47 btu/hr		1484.31 btu/hr		1513.32 btu/hr	
Windows Busy Max (S0)	1762.81 btu/hr		1720.15 btu/hr		1790.46 btu/hr	
Sleep (S3)	26.8 btu/hr	25.6 btu/hr	28.3 btu/hr	26.9 btu/hr	27.1 btu/hr	25.5 btu/hr
Off (S5)	4.88 btu/hr	4.13 btu/hr	6.35 btu/hr	5.60 btu/hr	4.74 btu/hr	4.03 btu/hr
Zero Power Mode (EuP)	1.40 btu/hr		2.87 btu/hr		1.30 btu/hr	

Example Configuration #3	*Processor Info*	2xW5580 (3.2GHZ, 8MB/1333)
	Memory Info	6x4GB DR 1333 MHz (RDIMM)
	Graphics Info	1xFX4800
	Disks/Optical/Floppy	2x300GB 15k SAS / 2 Optical / 1 Floppy
	PSU	1110W 80 PLUS® SILVER

Energy Consumption	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	259.5 W		253.10 W		260.10 W	
Windows Busy Typ (S0)	624.90 W		615.60 W		638.70 W	
Windows Busy Max (S0)	738.10 W		732.40 W		749.70 W	
Sleep (S3)	12.53 W	11.58 W	12.59 W	11.63 W	12.56 W	11.56 W
Off (S5)	2.12 W	1.32 W	2.56 W	1.73 W	2.10 W	1.30 W
Zero Power Mode (EuP)	0.46 W		0.87 W		0.43 W	

System Technical Specifications

Heat Dissipation**	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	885.67 btu/hr		896.83 btu/hr		887.72 btu/hr	
Windows Busy Typ (S0)	2132.78 btu/hr		2101.04 btu/hr		2179.88 btu/hr	
Windows Busy Max (S0)	2519.14 btu/hr		2499.68 btu/hr		2558.73 btu/hr	
Sleep (S3)	42.8 btu/hr	39.5 btu/hr	42.9 btu/hr	39.7 btu/hr	42.9 btu/hr	39.5 btu/hr
Off (S5)	7.24 btu/hr	4.51 btu/hr	8.74 btu/hr	5.90 btu/hr	7.15 btu/hr	4.44 btu/hr
Zero Power Mode (EuP)	1.40 btu/hr		2.87 btu/hr		1.30 btu/hr	

Example Configuration #4	*Processor Info*	2xW5580 (3.2GHZ, 8MB/1333)
	Memory Info	8x4GB DR 1333 MHz (RDIMM)
	Graphics Info	2xFX5800
	Disks/Optical/Floppy	4x300GB 15k SAS / 2 Optical / 1 Floppy
	PSU	1110W 80 PLUS® SILVER

Energy Consumption	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	436.40 W		426.60 W		433.60 W	
Windows Busy Typ (S0)	845.60 W		811.90 W		855.30 W	
Windows Busy Max (S0)	970.30 W		966.30 W		994.50 W	
Sleep (S3)	13.82 W	12.70 W	14.00 W	13.06 W	13.88 W	12.75 W
Off (S5)	2.12 W	1.33 W	2.54 W	1.73 W	2.24 W	1.30 W
Zero Power Mode (EuP)	0.46 W		0.86 W		0.43 W	

Heat Dissipation**	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	1489.43 btu/hr		1455.99 btu/hr		1479.88 btu/hr	
Windows Busy Typ (S0)	2886.03 btu/hr		2771.01 btu/hr		2919.14 btu/hr	
Windows Busy Max (S0)	3311.63 btu/hr		3297.98 btu/hr		3394.23 btu/hr	
Sleep (S3)	47.2 btu/hr	43.4 btu/hr	47.8 btu/hr	44.6 btu/hr	47.4 btu/hr	43.5 btu/hr
Off (S5)	7.24 btu/hr	4.54 btu/hr	8.67 btu/hr	5.90 btu/hr	7.65 btu/hr	4.44 btu/hr
Zero Power Mode (EuP)	1.40 btu/hr		2.87 btu/hr		1.30 btu/hr	

Example Configuration #5	*Processor Info*	2xIntel Xeon W5580 (3.2GHZ, 8MB/1333)
	Memory Info	8x2GB DR 1333 MHz (UDIMM)
	Graphics Info	1xFX5800
	Disks/Optical/Floppy	2x1000GB SATA / 1 Optical / 1 Floppy
	PSU	1110W 80 PLUS®

System Technical Specifications

Energy Consumption	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
On-Idle (ENERGY STAR Idle (S0))*	*174.0 W*		169.9 W		172.1 W	
ENERGY STAR = PMAX Windows running Unneck and Viewperf	*569.4 W*		556.7 W		570.1 W	
ENERGY STAR "Sleep" (S3)	*9.4 W*	–	9.8 W	–	9.7 W	–
ENEGY STAR "Standby" (Off) (S5)	*2.1W*	–	2.6 W	–	2.2 W	–

Heat Dissipation**	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
On-Idle (ENERGY STAR Idle (S0))*	*593.9 btu/hr*		579.9 btu/hr		587.4 btu/hr	
ENERGY STAR = PMAX Windows running Unneck and Viewperf	*1943.4 btu/hr*		1900.0 btu/hr		1945.8 btu/hr	
ENERGY STAR "Sleep" (S3)	*32.1 btu/hr*	–	33.4 btu/hr	–	33.1 btu/hr	–
ENEGY STAR "Standby" (Off) (S5)	*7.2 btu/hr*	–	8.9btu/hr	–	7.5 btu/hr	–

NOTES:

*Energy Star low energy mode

** Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

This product is in compliance with US executive order 13221, WOL (wake on LAN) disabled.

Declared Noise Emissions (Entry-level and High-end configurations)		
System Configuration (Entry level)	Processor Info	Dual Intel Xeon X5570 quad-core 2.93 GHz
	Memory Info	4 x 1GB DDR3 1333 MHz
	Graphics Info	Single NVIDIA NVS 290
	Disks/Optical/Floppy	2 x 250 GB 7200 RPM SATA/ CD/DVD-ROM/ TEAC 3.5" Floppy

System Technical Specifications

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		Sound Power (LWAd, bels)	Deskside Sound Pressure (LpAm, decibels)
	Idle	3.9	21
	SATA Hard drive Operating (random reads)	3.9	22
	Floppy Drive Operating (continuous copy)	Not Tested	Not Tested
	DVD-ROM Operating (sequential reads)	5.0	36

System Configuration (High-end)		
	Processor Info	Dual Intel Xeon W5580 quad-core 3.2 GHz
	Memory Info	4 x 1GB DDR3 1333 MHz
	Graphics Info	Single NVIDIA FX 4800
	Disks/Optical/Floppy	2 x 450 GB 15K SAS/ CD/DVD-ROM/ TEAC 3.5" Floppy

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		Sound Power (LWAd, bels)	Deskside Sound Pressure (LpAm, decibels)
	Idle	4.6	28
	SATA Hard drive Operating (random reads)	4.9	31
	Floppy Drive Operating (continuous copy)	Not Tested	Not Tested
	DVD-ROM Operating (sequential reads)	5.1	35

Environmental Requirements		
	Temperature	Operating: 5° to 35° C (40° to 95° F) Non-operating: -40° to 60° C (-40° to 140° F)
	Humidity	Operating: 8% to 85% RH, non-condensing Non-operating: 8% to 90% RH, non-condensing
	Maximum Altitude	Operating: 3,000 m (10,000 feet) Non-operating: 9,100 m (30,000 feet)
	Dynamic (new)	Shock Operating: ½-sine: 40g, 2-3ms Non-operating: ½-sine: 160 cm/s, 2-3ms (~100g) square: 422 cm/s, 20g NOTE: Values represent individual shock events and do not indicate repetitive shock events. Vibration Operating random: 0.5g (rms), 5-300 Hz Non-operating random: 2.0g (rms), 10-500 Hz NOTE: Values do not indicate continuous vibration.
	Cooling	Above 1524 m (5000 ft) altitude, maximum operating temperature is de-rated by 1° C (1.8° F) per 305 m (1000 ft) elevation increase

Physical Security and Serviceability	
Access Panel	Tool-less Includes system board and memory information
Optical Drive	Tool-less, no carrier or rails required
Floppy Drive	Tool-less
Hard Drives	Tool-less
Expansion Cards	Tool-less
Processor Socket	Tool-less
Green User Touch Points	Yes, on tool-free internal chassis components
Color-coordinated Cables and Connectors	Yes
Memory	Tool-less
System Board	Tool-less, retained by Front PCI Card Guide
Dual Color Power and HD LED on Front of Computer	Yes
Configuration Record SW	Yes
Over-Temp Warning on Screen	Yes
Restore CD/DVD Set	Restores the computer to its original factory shipping image - Can be obtained via HP Support
Dual Function Front Power Switch	Yes, causes a fail-safe power off when held for 4 seconds
Padlock Support	No
Cable Lock Support	Yes, Kensington Cable Lock (optional): Prevents entire system theft only. 3mm x 7mm slot at rear of system
Universal Chassis Clamp Lock Support	No
Solenoid Lock and Hood Sensor	No
Rear Port Control Cover	Yes, locks rear IO cables to prevent cable theft
Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control	Yes
Removable Media Write/Boot Control	Yes, prevents ability to boot from removable media on supported devices (and can disable writes to media)
Power-On Password	Yes, prevents an unauthorized person from booting up the workstation
Setup Password	Yes, prevents an unauthorized person from changing the workstation configuration
3.3V Aux Power LED on System PCA	No
NIC LEDs (integrated) (Green & Amber)	Yes

System Technical Specifications

CPUs and Heatsinks	A torx driver (T15) is needed to remove the CPU heatsink(s) before the CPU can be removed. CPU removal is tool-less
Power supply diagnostic LED	Yes
Power Button	Yes
Power LED	Yes, blue (normal), red (fault)
Hard drive activity LED	Yes, green
Internal speaker	Yes
System/Emergency ROM Flash Recovery	Recovers corrupted system BIOS.
Alert Standard Format (ASF) Specification	Industry-standard specification for network alerting in operating system-absent environments
Cooling Solutions	Air cooled forced convection, liquid cooling (optional)
Power Supply Fans	2x - 80mm x 25mm
CPU Heatsink Fan(s)	Mainstream (<=95W): 80mm x 15mm Performance (>95W): 92mm x 15mm
Chassis Fans	Rear: 2x - 92mm x 25mm Front (850W config): 1x - 92mm x 25mm (upper position) Front (1110W config): 2x - 92mm x 25mm
Memory Fans	2x - 80mm x 25mm
HP Vision Diagnostics Offline Edition	HP Vision Diagnostics Offline Edition The diagnostics utility must be booted from USB or CD, and enables you to perform testing and to view critical computer hardware and software configuration information from various sources. This utility enables you to: ● Run diagnostics ● View the hardware configuration of the system Key features and benefits HP Vision Diagnostics simplifies the process of effectively identifying, diagnosing, and isolating the hardware issues. In addition to robust management tools, service tools can be invaluable in quickly resolving system problems. To streamline the service process and resolve problems quickly, it is necessary to have the right information available at the time that a service call is placed. The primary information requirement, which is also the one that provides the greatest insight into potential system issues, is the configuration of the system. Vision Diagnostics helps provide higher system availability. Typical uses of Vision Diagnostics are: ● Testing and diagnosing apparent hardware failures ● Documenting system configurations for upgrade planning, standardization, inventory tracking, disaster recovery, and maintenance ● Sending configuration information to another location for more in-depth analysis
Access Panel Key Lock	Yes, prevents removal of the access panel and all internal components including optical and floppy drives
ACPI-Ready Hardware	Advanced Configuration and Power Management Interface (ACPI). ● Allows the system to wake from a low power mode. ● Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system

Trusted Platform Module Chip with optional ProtectTools Software	Yes
Integrated Chassis Handles	Yes
Power Supply	Tool-less, direct-connect (blind-mate)
PCI Card Retention	Yes, rear (all), middle (full-height cards), front (full-length with extender cards)
Flash ROM	Yes. SPI ROM
Diagnostic Power Switch LED on board	Yes
Clear Password Jumper	Yes
Clear CMOS Button	Yes
CMOS Battery Holder for easy Replacement	Yes
DIMM Connectors for easy Upgrade	Yes
HP ProtectTools Security Manager	Yes - not supported on Microsoft XP x64 or Linux

BIOS	
BIOS 32-bit Services	Standard BIOS 32-Bit Service Directory Proposal v0.4. BIOS supports 32 and 64-bit Operating systems.
PCI 3.0 Support	Full BIOS support for PCI Express through industry standard interfaces.
ATAPI	ATAPI Removable Media Device BIOS Specification Version 1.0.
BBS	BIOS Boot Specification v1.01
WMI Support	WMI is Microsoft's implementation of Web-Based Enterprise Management (WBEM) for Windows. WMI is fully compliant with the Distributed Management Task Force (DMTF) Common Information Model (CIM) and WBEM specifications.
BIOS Boot Spec 1.01+	Provides more control over how and from what devices the workstation will boot.
BIOS Power On	Users can define a specific date and time for the system to power on.
ROM Based Computer Setup Utility (F10)	Review and customize system settings controlled by the BIOS.
System/Emergency ROM Flash Recovery with Video	Recovers system BIOS in corrupted Flash ROM.
Replicated Setup	Saves BIOS settings to diskette or USB flash drive in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering Computer Configuration Utility (F10 setup).
SMBIOS	System Management BIOS 2.6, for system management information
Boot Control	Disables the ability to boot from removable media on supported devices.
Memory Change Alert	Alerts management console if memory is removed or changed.
Thermal Alert	Monitors the temperature state within the chassis. Three modes: • NORMAL - normal temperature ranges • ALERTED - excessive temperatures are detected. Raises a flag so action can be taken to avoid

	shutdown or provide for a smoother system shutdown • SHUTDOWN - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console.
ACPI (Advanced Configuration and Power Management Interface)	• Allows the system to enter and wake from low power modes (sleep states). • Enables an operating system to control system power consumption based on the dynamic workload. • Makes it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system. • Supports ACPI 2.0 for full compatibility with 64-Bit operating systems.
Ownership Tag	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen.
Remote Wakeup/Remote Shutdown	System administrators can power on, restart, and power off a client computer from a remote location.
ASF 2.0 Compliant	Allows workstation status to be monitored on a remote console.
Instantly Available PC (Suspend to RAM - ACPI sleep state S3)	Allows for very low power consumption with quick resume time
Remote System Installation via F12 (PXE 2.1) (Remote Boot from Server)	Allows a new or existing system to boot over the network and download software, including the operating system.
ROM revision levels	Reports the system BIOS revision level in Computer Configuration Utility (F10 Setup). Version is available through an industry standard interface (SMBIOS) so that management SW applications can use and report this information.
System board revision level	• Allows management SW to read the revision level of the system board • Revision level is digitally encoded into the HW and cannot be modified.
Start-up Diagnostics (Power-on Self-Test)	Assesses system health at boot time with selectable levels of testing.
Auto Setup when new hardware installed	System automatically detects addition of new hardware.
Keyboard-less Operation	The system can be booted without a keyboard.
Localized ROM Setup	Common BIOS image supports System Configuration Utility (F10 Setup) menus in 12 languages with local keyboard mappings.
Asset Tag	Allows the user or MIS to set a unique tag string in non-volatile memory.
Per-slot Control	Allows I/O slot parameters (option ROM enable/disable, bus latency) to be configured individually.
Adaptive Cooling	Fan control parameters are set according to detected hardware configuration for optimal acoustics.
Pre-boot Diagnostics	Early (pre-video) critical errors are reported via beeps and blinks on the power LED.
Industry Standard Specification Support	
Industry Standard	Revision Supported by the BIOS
ACPI	Advanced Configuration and Power Management Interface, Version 2.0c
ASF	Alert Standard Format Specification, Version 2.0
ATA (IDE)	AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b
CD Boot	"El Torito" Bootable CD-ROM Format Specification Version 1.0

EDD	• Enhanced Disk Drive Specification Version 1.1 • BIOS Enhanced Disk Drive Specification Version 3.0
EHCI	Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0
PCI	• PCI Local Bus Specification, Revision 2.3 • PCI Power Management Specification, Revision 1.1 • PCI Firmware Specification, Revision 3.0, Draft .7
PCI Express	• PCI Express Base Specification, Revision 2.0
PMM	POST Memory Manager Specification, Version 1.01
SATA	• Serial ATA Specification, Revision 1.0a • Serial ATA 3.0Gb/s: Extensions to Serial ATA 1.5Gb/s, Revision 1.0
SPD	PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B
TPM	Trusted Computing Group TPM Specification Version 1.2
UHCI	Universal Host Controller Interface Design Guide, Revision 1.1
USB	Universal Serial Bus Revision 1.1 Specification Universal Serial Bus Revision 2.0 Specification
SMBIOS	System Management BIOS Reference Specification, Version 2.6

Social and Environmental Responsibility

Eco-Label Certifications & Declarations	This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks: • ENERGY STAR qualified selectable configurations (Not in Linux) • EPEAT Gold® for all ENERGY STAR® configurations. For more details and a list of countries in which this product is registered, please visit the following link: http://www.epeat.net/ProductDisplay.aspx?return=search&action=view&search=true&productid=2489&ProductType=5&epeatcountryid=1 • US Federal Energy Management Program (FEMP) • China Energy Conservation Program • IT ECO declaration • Japan PC Green label* *This product conforms to the examination standards (2003 version) under JEITA's 'PC Green Label System.'
Batteries	This product complies with ISO standards: • EU Directive 91/ 157/ EEC • EU Directive 93/ 86/ EEC • EU Directive 98/ 101/ EEC Batteries used in the product do not contain: • Mercury greater than 5ppm by weight • Cadmium greater than 10ppm by weight • Lead greater than 4000ppm by weight Battery size: CR2032 (coin cell) Battery type: Lithium Metal

Restricted Material Usage	This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html): • Asbestos • Batteries - Mercury • Batteries - Cadmium • Batteries - Lead (non-rechargeable) • Batteries - Non-rechargeable Alkaline and Carbon-Zinc Batteries • Batteries - Classification as "Not Restricted" for Transport • Brominated Flame Retardants (PBBs, PBDEs, including DecaBDE) • Brominated Flame Retardants (all BFRs in external case plastic parts) • Cadmium and its compounds • Certain Azo Colorants • Chlorinated Hydrocarbons • Chlorinated Paraffins • Formaldehyde • Formaldehyde - emissions • Hexavalent Chromium and its compounds in metallic applications • Hexavalent Chromium and its compounds in non-metallic applications • Lead and its compounds • Lead in paint • Lead in Polyvinyl Chloride (PVC) coating of external cables, wires and cords • Mercury and its compounds • Nickel on external surfaces • Ozone Depleting Substances (ODS) • Polycyclic Aromatic Hydrocarbons (PAH) • Perfluorooctane sulfonates (PFOS) in parts • Perfluorooctane sulfonates (PFOS) in preparations • Polychlorinated Biphenyls (PCBs) and Polychlorinated Terphenyls (PCTs) • Polychlorinated Naphthalenes • Polyvinyl Chloride (PVC) in external case plastic parts • Radioactive Substances • Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)
Packaging	HP Workstation product packaging meets the following (refer to the HP General Specification for the Environment at: http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html): • Does not contain restricted substances listed in HP Standard 011-1 General Specification for the Environment (see link above). • Does not contain ozone-depleting substances (ODS). • Design packaging materials for ease of disassembly. • Does not contain heavy metals (lead, mercury, cadmium or hexavalent chromium) in excess of 100 ppm sum total for all heavy metals listed. • Maximizes the use of post-consumer recycled content materials in packaging materials. • All packaging material is recyclable. • Reduces size and weight of packages to improve transportation fuel efficiency. • Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.
Packaging Materials	
Internal	LDPE Foam: .592 kg
External	Cardboard carton and insert: 1.842 kg

End-of-Life Management and Recycling	Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment: [link to new HP white paper now in progress] Global Citizenship Report: http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Eco-label certifications: http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html
Service, Support and Warranty	On-site Warranty and Service (Note 1): This three-year, limited warranty and service offering delivers three years of on-site, next business-day (Note 2) service for parts and labor and includes free telephone support (Note 3) 8am - 5pm. Global coverage (Note 2) ensures that any product purchased in one country and transferred to another, non-restricted country will remain fully covered under the original warranty and service offering NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply. NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country. NOTE 3: Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries. HP Care Pack Services extend service contracts beyond the standard warranties. Service starts from date of hardware purchase. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at http://www.hp.com/go/lookuptool. Additional HP Care Pack Services information by product is available at http://www.hp.com/hps/carepack. Service levels and response times for HP Care Packs may vary depending on your geographic location
Additional Information	• This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC. • This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986). • This product contains 0% recycled materials (by wt.)

Manageability	
Remote Manageability Software Solutions	Visit: http://www.hp.com/go/easydeploy
System Software Manager	Visit: http://www.hp.com/go/ssm
Product Change Notification	• Program to proactively communicate Product Change Notifications (PCNs) and Customer Advisories by email to customers, based on a user-defined profile. • PCNs provide advance notification of hardware and software changes to be implemented in the factory providing time to plan for transition. • Customer Advisories provide concise, effective problem resolution, greatly reducing the need to call technical support.

As part of its commitment to hardware, software, and solution innovation, HP is proud to introduce this breakthrough platform configuration stability to HP Workstation customers. HP Stable & Consistent Offerings are built on the foundation of a carefully chosen set of hardware and software designed and tested to work with all HP Z Workstation platforms through their end of life. These components and their corresponding HP Workstation platform compatibility are outlined in this section.
HP Stable & Consistent Offerings are available worldwide to all HP Workstation customers-no special programs, no additional cost-no kidding. Simply select your hardware and software components when you customize your HP Workstation and be assured that you'll be able to buy that same configuration throughout the lifecycle of the product.

Processors	Product #	Offering
	WG692AV	Intel Xeon E5620 2.40 12MB/1066 4C CPU-1
	WG702AV	Intel Xeon E5620 2.40 12MB/1066 4C CPU-2
	WG695AV	Intel Xeon X5650 2.66 12MB/1333 6C CPU-1
	WG705AV	Intel Xeon X5650 2.66 12MB/1333 6C CPU-2

Hard Drives	Product #	Offering
	FX475AV	HP 250GB SATA 7200 1st HDD
	FX485AV	HP 250GB SATA 7200 2nd HDD
	FX495AV	HP 250GB SATA 7200 3rd HDD
	FX505AV	HP 250GB SATA 7200 4th HDD
	FX515AV	HP 250GB SATA 7200 5th HDD
	FX477AV	HP 500GB SATA 7200 1st HDD
	FX487AV	HP 500GB SATA 7200 2nd HDD
	FX497AV	HP 500GB SATA 7200 3rd HDD
	FX507AV	HP 500GB SATA 7200 4th HDD
	FX517AV	HP 500GB SATA 7200 5th HDD

Graphics	Product #	Offering
	FY879AV	NVIDIA Quadro NVS 295 256MB Graphics Card
	FY888AV	NVIDIA Quadro NVS 295 256MB Graphics (2nd)

Memory	Product #	Offering
	NL660AV	3GB (3x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU
	NL661AV	6GB (3x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU
	XB971AV	12GB (3x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU
	NL663AV	4GB (4x1GB) DDR3-1333 ECC Unbuffered RAM 2-CPU
	NL664AV	6GB (6x1GB) DDR3-1333 ECC Unbuffered RAM 2-CPU
	NL666AV	12GB (6x2GB) DDR3-1333 ECC Unbuffered RAM 2-CPU
	XB973AV	24GB (6x4GB) DDR3-1333 ECC Unbuffered RAM 2-CPU

Stable & Consistent Offerings

Optical and Removable Storage	Product #	Offering
	FX535AV	HP 16X DVD+-RW SuperMulti SATA 1st Drive
	FX537AV	HP 16X DVD+-RW SuperMulti SATA 1st Drive

Input Devices	Product #	Offering
	FX531AV	HP USB Optical Scroll Mouse
	FY898AV	HP USB Standard Keyboard

Operating Systems	Product #	Offering
	VM440AV	Genuine Windows® 7 Professional 64-bit

Processors	Intel® Xeon® Processor X5690 6C 3.46 GHz, 130W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	LB217AA
	Intel® Xeon® Processor X5687 4C 3.60 GHz, 130W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	LB216AA

Introduction

Intel's latest-generation microarchitecture represents the next step in unprecedented processor performance and dynamic scalability. Designed from the ground up to take advantage of hafnium-based Intel® 32nm hi-k metal gate silicon technology, Intel® Microarchitecture (Westmere) unleashes parallel processing performance enabled by Intel® QuickPath technology providing an integrated memory controller and high-speed interconnect per independent processing core.

Performance and Features

Maximum multitasking performance Intel® Microarchitecture (Westmere) offers the latest in processor innovation, including:

Dynamic scalability, managed cores, threads, cache, interfaces, and power for energy-efficient performance on demand.

Design and performance scalability for servers, workstations, notebooks and desktops with support for 4-12 cores and up to 24+ threads with Intel® Hyper-Threading Technology (Intel® HT Technology), and scalable cache sizes, system interconnects, and integrated memory controllers.

Intel® Turbo Boost Technology delivers additional performance automatically when needed by taking advantage of the processor's power and thermal headroom. This enables increased performance of both multi-threaded and single-threaded workloads.

Intel Hyper-Threading Technology brings high-performance applications into mainstream computing with 1-24 threads optimized for a new generation multi-core processor architecture.

Scalable shared memory of Intel® QuickPath technology features memory distributed to each processor with integrated memory controllers and high-speed point-to-point interconnects to unleash the performance of future versions of next-generation Intel® multi-core processors.

Multi-level shared cache improves performance and efficiency by reducing latency to frequently used data.

Turbo Boost Technology

This technology, now built into Xeon 5600 processors, will increase the speed of your processor on demand (from OS) if the CPU is operating below power / thermal specifications:

Benefit of Turbo Boost (how much CPU speed up) depends on number of active cores.

Likelihood of Turbo Boost operation increases when fewer cores are active.

Likelihood of Turbo Boost operation increases when dynamic power mgt is enabled

Processors	Intel® Xeon® Processor X5675 6C 3.06 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	LB215AA
	Intel® Xeon® Processor X5672 4C 3.20 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	LB214AA
	Intel® Xeon® Processor X5660 6C 2.80 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	WG732AA
	Intel® Xeon® Processor X5650 6C 2.66 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	WG731AA
	Intel® Xeon® Processor E5649 6C 2.53 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1333MHz, HT, Turbo	LB212AA
	Intel® Xeon® Processor X5647 4C 2.93 GHz, 130W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo	LB213AA
	Intel® Xeon® Processor E5645 6C 2.40 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1333MHz, HT, Turbo	LB211AA
	Intel® Xeon® Processor E5640 4C 2.66 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo	WG730AA
	Intel® Xeon® Processor E5620 4C 2.40 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo	WG728AA
	Intel® Xeon® Processor E5607 4C 2.26 GHz, 80W, 8M cache, 4.80 GT/s QPI, DDR3 1066MHz	LB210AA
	Intel® Xeon® Processor E5606 4C 2.13 GHz, 80W, 8M cache, 4.80 GT/s QPI, DDR3 1066MHz	LB209AA

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HP SAS (Serial Attached SCSI) Hard Drives for HP Workstations	600GB SAS 15K rpm 6Gb/s 3.5" HDD	Capacity	600GB	
		Height	1 in; 2.54 cm	
		Width	Media Diameter	3.5 in; 8.9 cm
			Physical Size	4 in; 10.17 cm
		Interface	SAS	
		Synchronous Transfer Rate (Maximum)	6.0 Gb/s	
		Buffer	16 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	Single Track	0.2 ms
			Average	3.4 ms
			Full Stroke	6.6 ms
		Rotational Speed	15,000 rpm	
		Logical Blocks	1,172,123,568 - 512 byte blocks	
		Operating Temperature	50° to 95° F (10° to 35° C)	
SATA (Serial ATA) Hard Drives for HP Workstations	600GB SATA 10K rpm SFF in 3.5" Frame HDD	Capacity	600GB	
		Height	1 in; 2.54 cm	
		Width	Media Diameter	2.5 in; 6.36 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (3.0Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 300MB/s	
		Buffer	32MB	
		Cache	Segmentable	
		Seek Time (typical reads, includes controller overhead, including settling)	Single Track	0.4 ms (max)
			Average	3.6 ms
			Full Stroke	9.0 ms
		Rotational Speed	10,000 rpm	
		Logical Blocks	1,172,123,568	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	300GB SATA 10K rpm SFF in 3.5" Frame HDD	Capacity	300,069,052,416 bytes	
		Height	1 in; 2.54 cm	
		Width	Media Diameter	2.5 in; 6.36 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
		Synchronous Transfer Rate (Maximum)	Up to 300 MB/s	
		Buffer	16 MB	

	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7 ms (maximum)
		Average	4.4 ms
		Full Stroke	9.5 ms
	Rotational Speed	10,000 rpm	
	Logical Blocks	586,072,368	
	Operating Temperature	41° to 131° F (5° to 55° C)	
160GB SATA 10K rpm SFF in 3.5" Frame HDD	**Capacity**	160,041,885,696 bytes	
	Height	1 in; 2.5 cm	
	Width	**Media Diameter**	2.5 in; 6.36 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (1.5 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	Up to 300 MB/s	
	Buffer	16 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7 ms (maximum)
		Average	4.4 ms
		Full Stroke	9.5 ms
	Rotational Speed	10,000 rpm	
	Logical Blocks	312,581,808	
	Operating Temperature	41° to 131° F (5° to 55° C)	
2.0TB SATA 7200 rpm 3Gb/s 3.5" HDD	**Capacity**	2.0TB	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4.0 in; 10.17 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing Enabled	
	Synchronous Transfer Rate (Maximum)	Up to 300MB/s	
	Buffer	64MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1.0 ms
		Average	10 ms
		Full Stroke	Not Specified
	Rotational Speed	7,200 rpm	
	Logical Blocks	3,907,029,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
1.5TB SATA 7200 rpm 3Gb/s 3.5" HDD	**Capacity**	1.5TB	
	Height	1 in; 2.54 cm	

	Width	Media Diameter	3.5 in; 8.9 cm
		Physical Size	4.0 in; 10.17 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	Up to 300MB/s	
	Buffer	32MB	
	Seek Time (typical reads, includes controller overhead, including settling)	Single Track	2 ms
		Average	11 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	2,930,277,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
1TB SATA 7200 rpm 3.0Gb/s 3.5" HDD	Capacity	1,000,204,886,016 bytes	
	Height	1 in; 2.5 cm	
	Width	Media Diameter	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	Up to 300 MB/s	
	Buffer	32 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	Single Track	2 ms
		Average	11 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	1,953,525,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
500GB SATA 7200 rpm 3Gb/s 3.5" HDD	Capacity	500,107,862,016 bytes	
	Height	1 in; 2.5 cm	
	Width	Media Diameter	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	300 MB/s	
	Buffer	16 MB	

	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	11 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
320GB SATA 7200 rpm 3Gb/s 3.5" HDD	**Capacity**	320,072,933,376 bytes	
	Height	0.98 in; 2.5 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4.0 in; 10.17 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	300 MB/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	12 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	625,142,448	
	Operating Temperature	41° to 131° F (5° to 55° C)	
250GB SATA 7200 rpm 3Gb/s 3.5" HDD	**Capacity**	250,059,350,016 bytes	
	Height	1 in; 2.5 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	300 MB/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	11 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	488,397,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
160GB SATA 7200 rpm 3Gb/s 3.5" HDD	**Capacity**	160,041,885,696 bytes	
	Height	1 in; 2.5 cm	

	Width	Media Diameter	3.5 in; 8.9 cm
		Physical Size	4 in; 10.2 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	300 MB/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	Single Track	2 ms
		Average	11 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	312,581,808	
	Operating Temperature	41° to 131° F (5° to 55° C)	
3.0TB SATA 7200 rpm 6Gb/s 3.5" HDD	Capacity	3.0TB	
	Height	1 in; 2.54 cm	
	Width	Media Diameter	3.5 in; 8.9 cm
		Physical Size	4.0 in; 10.17 cm
	Interface	Serial ATA (6.0Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 6.0 Gb/s	
	Buffer	64MB	
	Seek Time (typical reads, includes controller overhead, including settling)	Single Track	0.6 ms
		Average	11 ms
		Full Stroke	Not specified
	Rotational Speed	7200 rpm	
	Operating Temperature	41° to 140° F (5° to 60° C)	

Technical Specifications - Hard Drives

HP Solid State Drives for Workstations	HP 160GB SATA SSD	Capacity	160GB	
		Width	Media Diameter	NaN in; NaN cm
			Physical Size	2.5 in; 6.36 cm
		Interface	SATA	
		Synchronous Transfer Rate (Maximum)	3Gb/s	
		Operating Temperature	32° to 158° F (0° to 70° C)	
	HP 300GB SATA SSD	Capacity	300GB	
		Width	Physical Size	2.5 in; 6.36 cm
		Interface	SATA	
		Synchronous Transfer Rate (Maximum)	3Gb/s	
		Operating Temperature	32° to 158° F (0° to 70° C)	
	HP 160GB SATA X25-M SSD	Capacity	160,041,885,696 bytes	
		Height	0.28 in; 0.7 cm	
		Width	Media Diameter	NaN in; N/A cm
			Physical Size	2.5 in; 6.36 cm
		Interface	SATA	
		Synchronous Transfer Rate (Maximum)	3Gb/s	
		Seek Time (typical reads, includes controller overhead, including settling)	Average	Read: 75 microseconds; Write: 85 microseconds
		Logical Blocks	312,581,808	
		Operating Temperature	32° to 158° F (0° to 70° C)	

Integrated LSI SAS 1068E Controller with RAID 0, 1, 1E/10E	**PCI Bus**	PCI-Express x8 lanes	
	PCI Modes	Bus Master DMA	
	RAID Levels	RAID 0, 1, 1E/10E	
	PCI Data Burst Transfer Rate	8 PCI-Express lanes at 2.5Gbps in each direction for a total bandwidth of 5.0Gbps for each full duplex lane. Total aggregate bandwidth of up to 4GBps possible.	
	SAS Bandwidth	**Full Duplex**	LSI's SAS1068E 8-port SAS/SATA controller supports 1.5 and 3.0Gb/s per port data transfer rates.
	PCI Card Type	N/A	
	PCI Voltage	N/A	
	PCI Power	N/A	
	Bracket	N/A	
	Certification Level	PCI-Express 1.0a	
	IO Bus	Eight 3Gbps SAS/SATA ports	
	SAS Processor	LSISAS1068E	
	Internal Connectors	Four- SATA x1 connectors	
	External Connectors	None	
	Maximum Number of SCSI Devices	32	
	LED Indicators	On-board activity and fault LEDs	
	Integrated Mirroring	Integrated Mirroring option available	

LSI MegaRAID® 9260-8i SAS 6Gb/s ROC RAID Card and iBBU08 Battery Backup Unit	**PCI Bus**	PCI-Express (Gen2) V2.0 x8 lanes
	PCI Modes	Bus Master DMA
	RAID Levels	RAID 0, 1, 5, and 6 RAID spans 10, 50 and 60
	PCI Data Burst Transfer Rate	Up to 4GB/s
	PCI Card Type	Low profile, single PCIe slot design with full height bracket. The optional iBBU08 Battery Backup unit mounts on the controller card and the assembly remains within a single PCIe slot width.
	PCI Voltage	+3.3V Add-in Card
	PCI Power	12.5 Watts
	Certification Level	PCI-Express 2.0
	IO Bus	Eight 3 Gb/s and 6Gb/s compatible SAS/SATA ports
	Internal Connectors	Two SAS SFF8087 x4
	External Connectors	None
	Maximum Number of SCSI Devices	32. NOTE: HP Workstations do not support this many internal drives.

LED Indicators	Connector LEDs indicate whether the internal connector is active for ports 0-3 and 4-7

NVIDIA Quadro NVS 295 256MB Graphics Card	Form Factor	2.731 inches (H) × 6.600 inches (L), Half-Height
	Graphics Controller	NVIDIA Quadro NVS 295 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	256 MB GDDR3 SDRAM unified graphics memory
	Connectors	2 DisplayPort Comes with 2 DisplayPort to DVI-D Adapters ('DisplayPort to VGA' and 'DisplayPort to DL DVI' adapters available as an accessory)
	Maximum Resolution	Two DisplayPort outputs drive two digital displays up to 2560 x 1600 NOTE: This card supports up to two displays
	Display Output	• Drives DisplayPort enabled digital displays at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking • Drives DVI enabled digital displays at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking (through DisplayPort to DVI-D (single link) cable)
	Supported Graphics APIs	OpenGL 3.0 DirectX 10.0
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation (64-bit and 32-bit) SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	<24 Watts

Technical Specifications - Graphics

NVIDIA NVS 300 512MB Graphics Card	Form Factor	2.7 inches (H) x 5.7 inches (L), Half-Height
	Graphics Controller	NVIDIA NVS 300 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	512 MB GDDR3 SDRAM unified graphics memory
	Connectors	DMS-59 Includes DMS-59 to Dual DVI-I adapter DMS-59 to Dual DisplayPort adapter and DMS-59 to Dual VGA adapter available as an option DMS-59 to Dual DisplayPort adapter required for HP ZR30w Display
	Maximum Resolution	DVI: two digital displays up to 1920 x 1200 DisplayPort: two digital displays up to 2560 x 1600 VGA: two analog displays up to 1920 x 1080
	Image Quality Features	
	Display Output	This card support up to two displays: • Drives DVI enabled digital displays at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking • Drives DisplayPort enabled digital displays at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking (through optional DMS-59 to DisplayPort adapter) • Drives VGA enabled analog displays at resolutions up to 1920 x 1080 (through optional DMS-59 to VGA adapter)
	Supported Graphics APIs	OGL 3.3 DirectX 10.1
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	<18 Watts

Technical Specifications - Graphics

AMD FirePro 2270 512MB Graphics Card	Form Factor	Low Profile, Half Length, 2.3" x 6.6"
	Graphics Controller	AMD FirePro™ 2270 Professional Graphics
	Bus Type	PCI Express™ x16 Generation 2.0
	Memory	512MB DDR3
	Connectors	DMS-59 connector to support breakout cables for dual DisplayPort, DVI and VGA output. DMS-59 to Dual DVI adapter included. (Display Port and VGA adapters sold separately)
	Maximum Resolution	Digital 2560x1600 (DisplayPort) Analog 1920x1200 (DVI 60 Hz/ VGA 75Hz)
	RAMDAC	400 MHz DAC, 10-bit per channel
	Display Output	Card supports up to two displays
	Supported Graphics APIs	DirectX 11 and OpenGL 4.0
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Power Consumption	17W Maximum

ATI FirePro V3700 256MB Graphics Card	Form Factor	4.40 inches (H) × 6.70 inches (L) (11.18 cm (H) × 17.02 cm (L))
	Graphics Controller	ATI FirePro V3700 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	256 MB GDDR3 SDRAM unified graphics memory
	Connectors	2 Dual Link DVI-I Two DVI-I to VGA adapters included
	Maximum Resolution	Two dual-link DVI-I outputs drive two digital displays at resolutions up to 2560 x 1600 @ 60Hz or two analog displays at resolutions up to 2048 x 1536 @ 85Hz NOTE: This card supports up to two displays
	Shading architecture	Full Shader Model 4.0 • 40 Stream Processing Units • Dynamic load balancing and resource allocation for vertex, geometry, and pixel shaders • Common instruction set and texture unit access supported for all types of shaders • Dedicated branch execution units and texture address processors
	Supported graphics APIs	OpenGL 3.0 DirectX 10.1
	Available graphics drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit)

		Red Hat Enterprise Linux WS4 (64-bit and 32-bit) * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux 5 Desktop (64-bit and 32-bit) SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
NVIDIA Quadro FX 380 256MB Graphics Card	Form Factor	4.376 inches (H) × 6.60 inches (L)
	Graphics Controller	NVIDIA Quadro FX 380 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	256 MB GDDR3 SDRAM unified graphics memory
	Connectors	2 Dual-Link DVI-I Two DVI to VGA adapters included
	Maximum Resolution	Two dual-link DVI-I outputs drive two digital displays at resolutions up to 2560 x 1600 @ 60Hz or two analog displays at resolutions up to 2048 x 1536 @ 85Hz NOTE: This card supports up to two displays
	RAMDAC	Dual Internal 400 MHz DAC
	Shading architecture	Full Shader Model 4.0 (OpenGL 2.1/DirectX 10 class) • Long fragment programs (unlimited instructions) • Long vertex programs (unlimited instructions) • Looping and subroutines (up to 256 loops per vertex program) • Dynamic flow control • Conditional execution
	Supported graphics APIs	OpenGL 3.0 DirectX 10.0
	Available graphics drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power consumption	34 Watts

Technical Specifications - Graphics

NVIDIA Quadro 400 512MB Graphics Card	Form Factor	Low Profile, 2.7 inches (H) x 5.6 inches (L)
	Graphics Controller	NVIDIA Quadro 400 Graphics Board
	Bus Type	PCI Express x 16, Generation 2.0
	Memory	512MB DDR3 SDRAM
	Connectors	One (1) Dual-link DVI-I One (1) DisplayPort 1.1 Includes one DisplayPort to DVI-D adapter
	Maximum Resolution	DisplayPort 1.1: 2560 x 1600 @ 60 Hz Dual Link DVI-I: 2560 x 1600 @ 60 Hz Analog: 2048 x1536 @ 85 Hz
	RAMDAC	Dual internal 400 MHz DACs
	Display Output	This card supports up to two displays
	Supported Graphics APIs	OpenGL 3.2 DirectX 10.1 Shader Model 4.1
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	< 35 Watts

ATI FirePro V3800 512MB Graphics Card	Form Factor	2.71 in (H) x 6.61 in (L) "Single-Wide"
	Graphics Controller	ATI FirePro V3800 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	512 MB DDR3 SDRAM
	Connectors	1 DL DVI, 1 DP output One DP to DVI adapter included
	Maximum Resolution	Up to two digital displays at resolutions up to 2560 x 1600 @ 60Hz or two analog displays, one at resolutions up to 2048 x 1536 @ 85Hz, the other at up to 1920 x 1200 @ 60Hz (165 MHz dot clock) NOTES: This card supports up to two displays Use of more than two displays on Linux requires support for xrandr 1.2 or greater in the X server
	RAMDAC	400 MHz DAC, 10-bits per channel
	Image Quality Features	• Full 30-bit display pipeline for more accurate color reproduction superior image quality (30-bit monitor required for full 30-bit display) • Advanced video capabilities, including high fidelity gamma, color correction and scaling • Dedicated hardware (UVD2) for H.264, VC-1, and MPEG2 decode

Technical Specifications - Graphics

	Shading architecture	• Support for Full Shader Model 5.0 • 400 Stream Processing Units • Dynamic load balancing and resource allocation for vertex, geometry, and pixel shaders • Common instruction set and texture unit access supported for all types of shaders • Dedicated branch execution units and texture address processors • Anti-aliases Shaders and Textures as well as Polygon Edges
	Supported graphics APIs	DirectX 11, OpenGL 3.2, OpenCL 1.0 and full implementation of DirectCompute 11 (OpenCL™ compliant driver and SDK release scheduled in 2010)
	Available graphics drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) WS4 * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Power Consumption	43 Watts
ATI FirePro V4800 1GB Graphics Card	Form Factor	4.37 in (H) x 6.61 in (L)
	Graphics Controller	ATI FirePro V4800 Graphics Card
	Bus Type	PCI Express x 16, Generation 2.0
	Memory	1GB GDDR5 SDRAM
	Connectors	2 DisplayPort, 1 dual link DVI Output One DP to DVI adapter included
	Maximum Resolution	Up to three digital displays at resolutions up to 2560 x 1600 @ 60Hz or up to three analog displays, one at resolutions up to 2048 x 1536 @ 85Hz, plus two resolutions up to 1920 x 1200 @ 60Hz (165 MHz dot clock) NOTE: This card supports up to three displays with Windows 7, Vista or Linux, and up to two displays on XP
	RAMDAC	400 MHz DAC, 10-bit per channel
	Image Quality Features	• Up to 3 independent outputs with ATI Eyefinity technology support (More information at: www.amd.com/us/products/technologies/eyefinity/) • Full 30-bit display pipeline for more accurate color reproduction superior image quality2 • Advanced video capabilities, including high fidelity gamma, color correction and scaling • Dedicated hardware (UVD2) for H.264, VC-1, and MPEG2 decode NOTE: The use of more than two displays on Linux requires support for

		xrandr 1.2 or greater in the X server
	Shading architecture	• Support for Full Shader Model 5.0 • Dynamic load balancing and resource allocation for vertex, geometry, and pixel shaders • Common instruction set and texture unit access supported for all types of shaders • Dedicated branch execution units and texture address processors • Anti-aliases Shaders and Textures as well as Polygon Edges
	Supported graphics APIs	DirectX 11, OpenGL 3.2, OpenCL 1.03 and full implementation of DirectCompute 11 (OpenCL™ compliant driver and SDK release scheduled in 2010)
	Available graphics drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Power Consumption	69 Watts
NVIDIA Quadro 600 1GB Graphics Card	Form Factor	2.731" H x 6.6" L Single Slot Small Form Factor
	Graphics Controller	NVIDIA Quadro 600 Graphics Card
	Bus Type	PCI Express 2.0 x16
	Memory	1 GB GDDR3 128-bit
	Connectors	1 DVI-I output, 1DisplayPort output One DP to DVI adapter included with card DVI to VGA, DisplayPort to VGA and DisplayPort to DVI adapters available as accessories
	Maximum Resolution	DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)
	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	OpenGL 4.0 DirectX 11 CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit)

		Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 and Z200 SFF Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	40 Watts
AMD FirePro V5900 2GB Graphics Card	Form Factor	Full-height, full length, single slot
	Graphics Controller	AMD FirePro™ V5900 Professional Graphics
	Bus Type	PCI Express™ x16, Generation 2.1
	Memory	2GB GDDR5
	Connectors	2 x Display Port 1.2 1 x Dual-link DVI
	Maximum Resolution	2560 x 1600
	Display Output	DirectX 11 and OpenGL 4.1
	Supported Graphics APIs	DirectX 11 and OpenGL 4.1
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Linux® (32-bit or 64-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Power Consumption	< 75W
	Note	Monitors should be same model when using DP-DVI connections to use the Eyefinity feature. There are no additional limitations when using DisplayPort cables.

Technical Specifications - Graphics

NVIDIA Quadro 2000 1GB Graphics Card	Form Factor	4.376" H x 7" L Single Slot
	Graphics Controller	NVIDIA Quadro 2000 Graphics Card
	Bus Type	PCI Express 2.0 x16
	Memory	1 GB GDDR5 128-bit
	Connectors	1 DVI-I output, 2 DisplayPort outputs One DP to DVI adapter included with card DVI to VGA, DisplayPort to VGA and DisplayPort to DVI adapters available as accessories
	Maximum Resolution	Dual DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)
	Image Quality Features	• Up to 16K x16K texture and render processing • Transparent multisampling and super sampling • 16x angle independent anisotropic filtering • 128-bit floating point performance • 32-bit per-component floating point texture filtering and blending • Support for any combination of two connected displays • DisplayPort 1.1a, HDMI 1.3a, and HDCP support • NVIDIA® 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support • Full OpenGL quad buffered stereo support • Underscan/overscan compensation and hardware scaling • NVIDIA® nView® multi-display technology
	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	OpenGL 4.0 DirectX 11 CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 and Z200 SFF Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	62 Watts

Technical Specifications - Graphics

NVIDIA Quadro 5000 2.5GB Graphics Card	Form Factor	4.376" H x 9.75" L Dual Slot
	Graphics Controller	NVIDIA Quadro 5000 Graphics Card
	Bus Type	PCI Express 2.0 x16
	Memory	2.5 GB GDDR5 320-bit
	Connectors	DVI-I (1), DP (2), Stereo (1) One DP to DVI adapter included with card DVI to VGA, DisplayPort to VGA and DisplayPort to DVI adapters available as accessories
	Maximum Resolution	Dual DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)
	Image Quality Features	• Up to 16K x16K texture and render processing • Transparent multisampling and super sampling • 16x angle independent anisotropic filtering • 128-bit floating point performance • 32-bit per-component floating point texture filtering and blending • Support for any combination of two connected displays • DisplayPort 1.1a, HDMI 1.3a, and HDCP support • NVIDIA 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support • Full OpenGL quad buffered stereo support • Underscan/overscan compensation and hardware scaling • NVIDIA nView® multi-display technology
	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	OpenGL 4.0 DirectX 11 CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 and Z200 SFF Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	152 Watts

Technical Specifications - Graphics

NVIDIA Quadro 4000 2GB Graphics Card	Form Factor	4.376" H x 9.50" L Single Slot
	Graphics Controller	NVIDIA Quadro 4000 Graphics Card
	Bus Type	PCI Express 2.0 x16
	Memory	2 GB GDDR5 256-bit
	Connectors	1 DVI-I output, 2 DisplayPort outputs; One DP to DVI adapter included with card DVI to VGA, DisplayPort to VGA and DisplayPort to DVI (single- link or dual-link) adapters available as accessories (Optional stereo bracket available from 3rd party)
	Maximum Resolution	Dual DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)
	RAMDAC	400 MHz integrated RAMDAC
	Image Quality Features	• Up to 16K x16K texture and render processing • Transparent multisampling and super sampling • 16x angle independent anisotropic filtering • 128-bit floating point performance • 32-bit per-component floating point texture filtering and blending • Support for any combination of two connected displays • DisplayPort 1.1a, HDMI 1.3a, and HDCP support • NVIDIA 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support • Full OpenGL quad buffered stereo support • Underscan/overscan compensation and hardware scaling • NVIDIA nView® multi-display technology
	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	OpenGL 4.0 DirectX 11 CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 and Z200 SFF Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	142 Watts

NVIDIA Quadro 6000 6GB Graphics Card	Form Factor	4.376" H x 9.75" L Dual Slot
	Graphics Controller	NVIDIA Quadro 6000 Graphics Card
	Bus Type	PCI Express 2.0 x16
	Memory	6 GB GDDR5 384-bit ECC Memory
	Connectors	1 DVI-I output, 2 DisplayPort outputs, 1 Stereo(3-pin mini DIN); One DP to DVI adapter included with card DVI to VGA, DisplayPort to VGA and DisplayPort to dual link DVI adapters available as accessories
	Maximum Resolution	Dual DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)
	Image Quality Features	• 30-bit color • Up to 16K x16K texture and render processing • Transparent multisampling and super sampling • 16x angle independent anisotropic filtering • 128-bit floating point performance • 32-bit per-component floating point texture filtering and blending • 64x full scene antialiasing (FSAA) / 128x FSAA in SLI Mode • Support for any combination of two connected displays • DisplayPort 1.1a, HDMI 1.3a, and HDCP support • NVIDIA 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support • Full OpenGL quad buffered stereo support • Underscan/overscan compensation and hardware scaling • NVIDIA nView® multi-display technology
	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	OpenGL 4.0 DirectX 11 CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) WS4 (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com

	Power Consumption	<250 Watts
AMD FirePro V7900 2GB Graphics Card	Form Factor	Full height, full length, single slot
	Graphics Controller	AMD FirePro™ V7900 Professional Graphics
	Bus Type	PCI Express™ x16, Generation 2.1
	Memory	2GB GDDR5
	Connectors	4 x DisplayPort 1.2
	Maximum Resolution	2560 x1600
	Supported Graphics APIs	DirectX 11 and OpenGL 4.1
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Linux® (32-bit or 64-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Power Consumption	< 150W
	Note	Monitors should be same model when using DP-DVI connections to use the Eyefinity feature. There are no additional limitations when using DisplayPort cables.

NVIDIA Tesla C2050 Compute Processor	Form Factor	4.376 inches by 9.75 inches Dual Slot
	System Interface	PCI Express Gen2 ×16
	Video Outputs	One Dual Link DVI-I (Consumer graphics level of performance)
	Memory	3GB GDDR5
	Peak Memory Bandwidth	+170 GB/s
	Supported APIs	CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Supported Operating Systems	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) 5,6 Desktop/Workstation (64-bit and 32-bit) SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Processor Cores	448 CUDA cores
	Power Consumption	~225 Watts NOTE 1: An 1110W PSU is required for Tesla C2050 on the Z800 NOTE 2: A 600W PSU is required for Tesla C2050 on the Z400
NVIDIA Tesla C2075 Compute Processor	Form Factor	4.376 inches by 9.75 inches Dual Slot
	System Interface	PCI Express Gen2 ×16
	Video Outputs	One Dual Link DVI-I (Entry graphics level of performance)
	Memory	6GB GDDR5
	Peak Memory Bandwidth	+170 GB/s
	Supported APIs	CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Supported Operating Systems	Genuine Windows 7 Professional (64-bit) Genuine Windows Vista Business (64-bit) Microsoft Windows XP Professional (64-bit) Red Hat Enterprise Linux (RHEL) 5, 6 Desktop/Workstation (64-bit) SUSE Linux Enterprise Desktop 11 (64-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Processor Cores	448 CUDA cores

Power Consumption	~215 Watts NOTE 1: An 1110W PSU is required for Tesla C2075 on the Z800 NOTE 2: A 600W PSU is required for Tesla C2075 on the Z400

Technical Specifications - Multimedia and Audio Devices

Integrated Intel/Realtek HD ALC262 Audio	Type	Integrated
SoundBlaster (Creative Labs) X-Fi Titanium PCIe Audio Card	24-bit Analog-to-Digital conversion of analog inputs	96kHz sample rate
	24-bit Digital-to-Analog conversion of digital sources	96kHz to analog 7:1 speaker output
	24-bit Digital-to-Analog conversion of stereo digital sources	8, 11.025, 16, 22.05, 24, 32, 44.1, 48 and 96kHz
	16-bit to 24-bit recording sampling rates	16-bit/44.1kHz, 16-bit/48kHz, 24-bit/44.1kHz, 24-bit/48kHz and 24-bit/96kHz with direct monitoring
	Enhanced SoundFont support	Up to 24-bit resolution
	Signal-to-Noise Ratio (2okHz Low-pass filter, A-Weighted)	109dB
	Total Harmonic Distortion + Noise at 1kHz (20kHz Low-pass filter)	.004%
	Frequency Response (-3dB, 24-bit/96kHz input)	10Hz to 46kHz
	Frequency Response (-3dB, 24-bit/192kHz input)	10Hz to 46kHz
	Speaker and Headphone connections	Stereo to 7.1 (Line Out via three 3.5mm mini jacks)
	Flexijack	Line In/ Microphone In/Optical Out via shared 3.5mm mini jack
	Front Panel Header	Intel HD Audio Compatible (2x5 pin)
	Operating System	Windows 7 Professional 32-bit and 64-bit Microsoft Windows Vista Business 32-bit and 64-bit Microsoft® Windows® XP Professional SP2 Microsoft Windows XP Professional x64 Edition
	Minimum System Requirements	System RAM: 512MB Operating System: Windows Vista 32-bit and 64-bit version or Windows XP 32-bit or 64-bit version

Technical Specifications - Optical and Removable Storage

HP DVD-ROM Drive	Description		5.25-inch, half-height, tray-load
	Mounting Orientation		Either horizontal or vertical
	Interface Type		SATA/ATAPI
	Dimensions (WxHxD)		15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 in)
	Disc Capacity	DVD-ROM	Single layer: Up to 4.7 GB Double layer: Up to 8.5 GB
	Access Times	DVD-ROM Single Layer	< 140 ms (typical)
		CD-ROM Mode 1	< 125 ms (typical)
		Full Stroke DVD	< 250 ms (seek)
		Full Stroke CD	< 210 ms (seek)
	Power	Source	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p
		DC Current	5 VDC - <1000 mA typical, < 1600 mA maximum 12 VDC - < 600 mA typical, < 1400 mA maximum
	Operating Environmental (all conditions non-condensing)	Temperature	5° to 50° C (41° to 122° F)
		Relative Humidity	10% to 90%
		Maximum Wet Bulb Temperature	30° C (86° F)
		Operating Systems Supported	Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Red Hat Enterprise Linux(RHEL) WS4**, 5, 6 Desktop/Workstation, Removed reference to "Novell" because of acquisition and changed product reference to "SUSE Linux Enterprise Desktop 10 & 11", No driver is required for this device. Native support is provided by the operating system. * Certain Windows Vista product features require advanced or additional hardware. See http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx and http://www.microsoft.com/windowsvista/getready/capable.mspx for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. Windows Vista Business disk also included for future upgrade if desired. For Windows Vista system requirements, visit:

http://www.windowsvista.com/systemrequirements.

** RHEL WS4 not supported on Z200/Z200SFF

HP DVD+/-RW Drive	Description	5.25-inch, half-height, tray-load		
	Mounting Orientation	Either horizontal or vertical		
	Interface Type	SATA/ATAPI		
	Dimensions (WxHxD)	15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 in)		
	Disc Formats	DVD-RAM DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW		
	Disc Capacity	DVD-ROM	8.5 GB DL or 4.7 GB standard	
		Full Stroke DVD	< 250 ms (seek)	
		Full Stroke CD	< 210 ms (seek)	
	Maximum Data Transfer Rates	CD ROM Read	CD-ROM, CD-R Up to 40X CD-RW Up to 32X	
		DVD ROM Read	DVD-RAM	Up to 12X
			DVD+RW	Up to 8X
			DVD-RW	Up to 8X
			DVD+R DL	Up to 8X
			DVD-R DL	Up to 8X
			DVD-ROM	Up to 16X
			DVD-ROM DL	Up to 8X
			DVD+R	Up to 16X
			DVD-R	Up to 16X
	Power	Source	SATA DC power receptacle	
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p	
		DC Current	5 VDC - <1000 mA typical, <1600 mA maximum 12 VDC - <600 mA typical, <1400 mA maximum	
	Operating Environmental (all conditions non-condensing)	Temperature	5° to 50° C (41° to 122° F)	
		Relative Humidity	10% to 90%	
		Maximum Wet Bulb Temperature	30° C (86° F)	
		Operating Systems Supported	Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*.	

		Red Hat Enterprise Linux(RHEL) WS4**, 5, 6 Desktop/Workstation SUSE Linux Enterprise Desktop 10 & 11 No driver is required for this device. Native support is provided by the operating system. *Certain Windows Vista product features require advanced or additional hardware. See http://microsoft.com/windowsvista/getready/hardwarereqs.mspx and http://www.microsoft.com/windowsvista/getready/capable.mspx for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. Windows Vista Business disk also included for future upgrade if desired. For Windows Vista system requirements, visit http://www.windowsvista.com/systemrequirements ** RHEL WS4 not supported on Z200/Z200SFF
	Kit Contents	HP SATA SuperMulti DVD Writer Drive, Roxio Easy Media Creator software, Intervideo WinDVD Software, installation guide, and DVD+R media.

HP Slot Load DVD+/-RW Drive	Description		Slim-Line, Slot-load
	Mounting Orientation		Either horizontal or vertical
	Interface Type		SATA
	Dimensions (WxHxD)		12.7 x 1.2 x 12.9 cm (5 x 0.5 x 5 in)
	Disc Formats		DVD-RAM DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW
	Disc Capacity	DVD-ROM	5/9/10/18 G DVD-Single / Dual (PTP, OTP) (Read Only) 4.7G DVD±R/RW (Read & Write) DVD±R Dual (Read & Write) 80mm DVD DVD-RAM (Read & Write)
		CD-ROM	650 MB CD-ROM (Read Only) 80mm CD 800/700/650/ CD-Recordable (Read & Write) 700/650MB CD-Rewritable (Read & Write) 700/650MB High Speed CD-Rewritable (Read & Write) 700/650MB Ultra & Ultra+ Speed CD-Rewritable (Read & Write)
		Full Stroke DVD	< 270 ms (seek)
		Full Stroke CD	< 250 ms (seek)

Technical Specifications - Optical and Removable Storage

	Maximum Data Transfer Rates	CD ROM Read	CD-ROM, CD-R and CD-RW Up to 24X
		DVD ROM Read	DVD-RAM Up to 5X DVD Single layer Up to 8X DVD Dual Layer up to 6X
	Power	Source	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
		DC Current	5 VDC 40 mA typical, 800 mA maximum
	Operating Environmental (all conditions non-condensing)	Temperature	5° to 50° C (41° to 122° F)
		Relative Humidity	10% to 90%
		Operating Systems Supported	Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows XP Professional or Windows XP Home 32*. Red Hat Enterprise Linux(RHEL) WS4, 5, 6 Desktop/Workstation, SUSE Linux Enterprise Desktop 10 & 11, No driver is required for this device. Native support is provided by the operating system.
		Kit Contents	Factory integrated only. Not available as a kit.

HP Blu-Ray Writer	Description	5.25-inch, half-height, tray-load		
	Mounting Orientation	Either horizontal or vertical		
	Interface Type	SATA		
	Dimensions (WxHxD)	15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 in)		
	Disc Formats	BD-ROM BD-R BD-RE DVD-RAM DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW		
	Disc Capacity	DVD-ROM	8.5 GB DL or 4.7 GB standard	
		Blu-ray	50 GB DL or 25 GB standard	
		Full Stroke DVD	< 250 ms (seek)	
		Full Stroke CD	< 210 ms (seek)	
		Blu-ray	<275 ms (seek)	
		Startup Time	BD-ROM (SL/DL)	25S / 28S
			BD-R (SL/DL)	25S / 28S
			BD-RE (SL/DL)	25S / 28S
			DVD-ROM (SL/DL)	18S / 18S
			DVD-R (SL/DL)	25S / 25S

		DVD-RW	25S
		DVD+R (SL/DL)	25S / 25S
		DVD+RW	25S
		DVD-RAM	45S
		CD-ROM	15S
Maximum Data Transfer Rates	CD ROM Read	CD-ROM	Up to 40X
		CD-R	Up to 40X
		CD-RW	Up to 40X
	DVD ROM Read	DVD-RAM	Up to 5X
		DVD+RW	Up to 10X
		DVD-RW	Up to 10X
		DVD+R DL	Up to 8X
		DVD-R DL	Up to 8X
		DVD-ROM	Up to 16X
		DVD-ROM DL	Up to 8X
		DVD+R	Up to 12X
		DVD-R	Up to 12X
	Blu-Ray	BD-ROM	Up to 6X
		BD-ROM DL	Up to 4.8X
		BD-R	Up to 6X
		BD-R DL	Up to 4.8X
		BD-R	Up to 6X
		BD-RE SL/DL	Up to 4.8X
Power	Source	SATA DC power receptacle	
	DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 10%-100 mV ripple p-p	
	DC Current	5 VDC -900 mA typical, 1200 mA maximum 12 VDC -1000 mA typical, 1600 mA maximum	
Operating Environmental (all conditions non-condensing)	Temperature	5° to 50° C (41° to 122° F)	
	Relative Humidity	15% to 80%	
	Maximum Wet Bulb Temperature	30° C (86° F)	
	Operating Systems Supported	Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Red Hat Enterprise Linux(RHEL) WS4**, 5, 6 Desktop/Workstation, SUSE Linux Enterprise Desktop 10 & 11	

* No driver is required for this device. Native support is provided by the operating system.

** RHEL WS4 not supported on Z200/Z200SFF

	Kit Contents	HP Blue Laser RW Drive, Roxio Easy Media Creator software, Intervideo WinDVD Software, installation guide.
	Disclaimer	As Blu-Ray is a new format containing new technologies, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-Ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.
HP 22-in-1 Media Card Reader	Description	The Media Card Reader device uses the same physical form factor and mounting as a Floppy Disk Drive. The device connects to a 2x5 two-channel USB header on the motherboard of the system. There is no USB controller card provided. Please see the Disc Formats section below for a list of flash memory card formats that are supported.
	Mounting Orientation	The Media Card Reader can be mounted in a dedicated Floppy Drive bay (if the chassis provides one) or in an appropriate Optical Bay adapter. It will operate in any orientation.
	Interface Type	USB 2.0 (one channel dedicated to the separate USB port; one channel dedicated to the flash memory card slots)
	Dimensions (WxHxD)	124.5 x 101.6 x 25.4 mm (4.9 x 4.0 x 1.0 in)
	Disc Formats	xD-Picture Micro SD Micro SDHC SD SDHC SDXC Mini SD Mini SDHC MultiMediaCard (MMC) Reduced Size MultiMediaCard (RS MMC) MultiMedia Card 4.2 (MMC Plus, including MMC Plus HC) Reduced Size MultiMedia Card 4.2 (MMC Mobile, including MMC Mobile HC) CompactFlash Card Type I CompactFlash Card Type II MicroDrive Memory Stick (MS) MagicGate Memory Stick (MG) MagicGate Memory Stick Duo Memory Stick Select Memory Stick Duo (MS Duo) Memory Stick PRO (MS PRO) Memory Stick PRO Duo (MS PRO Duo) Memory Stick PRO-HG Duo Two additional formats are usable with adapters (not supplied): MMC Micro Memory Stick Micro (M2)

HP DX115 Removable Drive Enclosure	Interface Type	Compatible with SAS or SATA controllers
	Dimensions (WxHxL)	147.6 x 41.1 x 205 mm (5.81 x 1.62 x 8.08 in)
	Weight	Frame and Carrier: 1.73 kg (3.8 lbs) Carrier: 0.45 kg (1 lbs)

HP IEEE 1394b FireWire PCIe Card	Data Transfer Rate	Supports up to 800 Mbps
	Devices Supported	IEEE-1394 compliant devices
	Bus Type	PCIe card full height PCIe slots
	Ports	Two IEEE-1394b bilingual 9-Pin Connector (Rear)
	Internal Connectors	One 10-Pin header Connector
	System Requirements	Windows 7 Professional 32-bit and 64-bit, Microsoft® Windows® XP Professional, Windows XP Home, Windows Vista. Not supported on Linux. Pentium® III or higher processor 128-MB RAM 1-GB Hard Drive CD-ROM drive Built in sound system Available PCI slot
	Temperature – Operating	50° to 131° F (10° to 55° C)
	Temperature – Storage	–22° to 140° F (–30° to 60° C)
	Relative Humidity – Operating	20% to 80%
	Compliances	FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC
	Operating Systems Supported	Windows 7 Professional 32-bit and 64-bit, Windows Vista® Business 32-bit and 64-bit, Windows® XP Professional, XP Professional 64-bit. Not supported on Linux.

HP USB 3.0 2x2 Port SuperSpeed PCIe x1 Card	Dimensions (HxD)	TBD
	Ports	2 External, 2 internal
	Operating Systems Supported	Microsoft Windows 7, Windows Vista*, Windows XP Professional (32-bit and 64-bit); Red Hat Enterprise Linux 6.0, SuSE Linux Enterprise Desktop 11 Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.
	Kit Contents	I/O and Security Software and Documentation CD with software drivers and documentation, HP SuperSpeed USB 3.0 PCIe x1 card (with full-height expansion bracket attached), SATA to SATA split power extension cable, Low profile expansion bracket to replace the full-height expansion bracket required on some computer models and HP SuperSpeed USB 3.0 PCIe x1 Card Quick Setup.
	Regulatory Approvals and registrations	FCC 15B, CE EN55022+ EN55024, VCCI, CISPR 22 AS/NZS CISPR 22, LCIE CB service(ITE/AV) IEC 60950-1, Korea EMC, UL USB-IF
	Weight	0.21 lb (95.0 g)
	Warranty	The HP USB 3.0 2x2 Port Super Speed PCIe x1 Card has either a one-year limited warranty or the remainder of the warranty of the HP product in which it is installed. Technical support is available seven days a week, 24 hours a day, by phone, as well as online support forums. Certain restrictions and exclusions apply.

Technical Specifications - Controller Cards

HP SuperSpeed USB 3.0 PCIe x1 Card	Dimensions (HxD)	Full-height: 4.13 x 2.32 in; Low profile: 2.68 x 2.32 in (Full-height: 104.89 x 59.04 mm; Low profile: 68.09 x 59.04 mm)
	Ports	2 External
	Operating Systems Supported	Microsoft Windows 7, Windows Vista*, Windows XP Professional (32-bit and 64-bit); Red Hat Enterprise Linux 6.0, SuSE Linux Enterprise Desktop 11 * Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.
	Kit Contents	I/O and Security Software and Documentation CD with software drivers and documentation, HP SuperSpeed USB 3.0 PCIe x1 card (with full-height expansion bracket attached), SATA to SATA split power extension cable, Low profile expansion bracket to replace the full-height expansion bracket required on some computer models and HP SuperSpeed USB 3.0 PCIe x1 Card Quick Setup.
	Regulatory Approvals and registrations	FCC 15B, CE EN55022+ EN55024, VCCI, CISPR 22 AS/NZS CISPR 22, LCIE CB service (ITE/AV) IEC 60950-1, Korea EMC, UL USB-IF
	Weight	0.21 lb (95.0 g)
	Warranty	The HP Super Speed USB 3.0 PCIe x1 Card has either a one-year limited warranty or the remainder of the warranty of the HP product in which it is installed. Technical support is available seven days a week, 24 hours a day, by phone, as well as online support forums. Certain restrictions and exclusions apply.

Integrated Broadcom 5764 PCIe LOM Controller	Connector	RJ45
	Data Rates Supported	10/100/1000BT
	Bus Architecture	PCIe X1
	Alerting	ASF 2.0

Broadcom (5761) NetXtreme Gigabit Ethernet Plus NIC	Connector	RJ-45
	Controller	Broadcom 5761 PCI-Express LAN Controller
	Memory	8 MB NVRAM serial Flash
	Data Rates Supported	10/100/1000 Mbps
	Compliance	IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3AB, 802.3u, and 802.3x
	Bus Architecture	PCI-Express
	Data Path Width	Single Channel PCI-Express
	Data Transfer Mode	Bus Master DMA
	Hardware Certifications	FCC class B, Canada and US NRTL Mark, C-Tick for Australia, BSMI for Taiwan, VCCI for Japan, MIC for Korea, GOST for Russia, UL listed (E212044), European Union Notice (CE 0682)
	Power Requirement	1.8W @ 3.3V
	Boot ROM Support	Yes
	Network Transfer Mode	Full-duplex Half-duplex (not available for the 1000BASE-T transceiver)
	Network Transfer Rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps
	Operating Temperature	32° to 131°F (0° to 55° C)
	Operating Humidity	131° F (55° C) with 5% to 95% non-condensing humidity
	Dimensions	7 cm x 10.5 cm (2.75 in x 4.13 in), low profile compatible
	Operating System Driver Support	Windows 7 Professional 32-bit and 64-bit, Windows Vista 32-bit SP1, Windows Vista x64 SP1, Windows XP 32 bit professional, Windows XP x64 Red Hat Enterprise Linux(RHEL) WS4*, 5, 6 Desktop/Workstation Novell SLED 10 & 11 *RHEL WS4 not supported on Z200/Z200SFF
	Management Capabilities	ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0, Broadcom mgmt utility, ASF2.0, DASH 1.0 and DASH 1.1 profiles
	Kit Contents	Broadcom NetXtreme Gigabit Ethernet Plus NIC, Broadcom NetXtreme Gigabit Ethernet Plus NIC USB Cable Assembly, CD, drivers, quick install guide, product warranty statement

Technical Specifications - Networking and Communications

HP NC360T PCI Express Dual Port Gigabit NIC	Connector	Two RJ-45
	Controller	Intel 82571EB
	Memory	Integrated 96KB
	Data Rates Supported	10/100/1000 Mbps
	Compliance	802.3, 802.3u, 802.3x, 802.3ab, 802.3ad, 802.1p, 802.1Q
	Bus Architecture	PCI-E 1.0a
	Data Path Width	Four lane (x4) PCI Express compatible with x4, x8, and x16 PCI Express slots
	Data Transfer Mode	Bus-master DMA
	Hardware Certifications	FCC Class B, VCCI Class B, BSMI Class A, CISPR 22 Class B, EN 55022 Class B, EN55024-1, ICES-003 Class B, MIC Class B, ACA Class B, UL, Canada UL, EN60950
	Power Requirement	1280 mA @ 3.3V typical
	Boot ROM Support	Yes
	Network Transfer Rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps
	Operating Temperature	32° to 131°F (0° to 55° C)
	Operating Humidity	0% to 95% non-condensing
	Dimensions	12.95 x 6.8 cm (5.1 x 2.7 in)
	Operating System Driver Support	Windows Vista Business 64, Windows Vista Business 32, Windows XP Professional, Windows XP Professional x64 Edition. Red Hat Enterprise Linux(RHEL) WS4, 5, 6 Desktop/Workstation Novell SLED 10 & SLED 11
	Management Capabilities	WOL , PXE 2.1
	Kit Contents	HP NC360T PCI Express Dual Port Gigabit NIC, low profile bracket, CD containing Intel PROset II NIC drivers, quick install guide, product warranty statement

Technical Specifications - Networking and Communications

Intel Gigabit CT Desktop NIC	Connector	RJ-45
	Controller	Intel WG82574L Gigabit Ethernet Controller
	Memory	Integrated Dual 48K configurable transmit receive FIFO Buffers
	Data Rates Supported	10/100/1000 Mbps
	Compliance	IEEE 802.1P, 802,1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
	Bus Architecture	PCI-E 1.0a
	Data Path Width	X1, 250 MB/s, Bi-directional interface
	Data Transfer Mode	Bus-master DMA
	Hardware Certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	Power Requirement	Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T
	Boot ROM Support	Yes
	Network Transfer Rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps
	Operating Temperature	32° to 131°F (0° to 55° C)
	Operating Humidity	85% at 131° F (55° C)
	Dimensions	12.1 x 5.7 x 2.0 cm (4.75 x 2.25 x 0.8 in)
	Operating System Driver Support	Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64, Windows Vista Business 32, Windows XP Professional, Windows XP x64. Red Hat Enterprise Linux 4 (RHEL4.8 or newer)*, Red Hat Enterprise Linux 5 (RHEL5.3 or newer), Red Hat Enterprise Linux 6 * RHEL WS4 not supported on Z200/Z200SFF
	Management Capabilities	WOL , PXE, DMI, WFM 2.0
	Kit Contents	Intel Gigabit CT Desktop NIC, low profile bracket, CD containing Intel PROset II NIC drivers, quick install guide, product warranty statement

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